



T 510.836.4200
F 510.836.4205

1939 Harrison Street, Ste. 150
Oakland, CA 94612

www.lozeaudrury.com
brian@lozeaudrury.com

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Via Email

Evan Trubee, Mayor
Joe Pradetto, Mayor Pro Tem
Karina Quintanilla, Councilmember
Gina Nestande, Councilmember
Jan Harnik, Councilmember
Palm Desert City Council
73-510 Fred Waring Drive
Palm Desert, CA 92260-2578
cityhall@palmdesert.gov
CityClerk@palmdesert.gov

**Re: SAFER Appeal Comment
Catavina Residential Project (PP25-0003; TTM 39159; TTM 39160)
City Council Agenda Item 11.d (Jan. 8, 2025)**

To Mayor Trubee, Mayor Pro Tem Pradetto, and Honorable City Councilmembers:

This correspondence is submitted on behalf of Supporters Alliance for Environmental Responsibility ("SAFER") in support of their appeal regarding the mitigated negative declaration ("MND"), consisting of the Draft MND released in September 2025 and the Final MND released in October 2025, prepared for the Catavina Residential Project ("Project"). The appeal is scheduled to be heard as Agenda Item 11.d at the City Council's January 8, 2026 meeting.

SAFER is concerned that approval of the Project and MND will violate the California Environmental Quality Act ("CEQA") by failing to prepare a full environmental impact report ("EIR") due to significant impacts to greenhouse gases ("GHGs"), biological resources, and indoor air quality. Furthermore, the MND fails to provide substantial evidence that the Project's construction-related and operational air quality impacts will be less than significant.

SAFER's review of the MND was assisted by expert ecologist Dr. Shawn Smallwood, Ph.D., air quality expert Paul E. Rosenfeld, Ph.D., of the Soil/Water/Air Protection Enterprise ("SWAPE"), , and indoor air quality expert Francis Offermann, PE, CIH. The written comments and CVs of Dr. Smallwood, Dr. Rosenfeld, and Mr. Offermann are attached hereto as Exhibit A, Exhibit B, and Exhibit C, respectively.

CEQA requires that an EIR be prepared instead of an MND if there is any substantial

evidence that the Project may result in a significant impact, even if there is other contrary evidence. As discussed below, SAFER, with the assistance of the three experts listed above, have roundly met that threshold. For that reason, SAFER respectfully requests that the City Council grant the appeal and direct planning staff to prepare an EIR prior to any further consideration of the Project.

PROJECT DESCRIPTION

The Catavina Residential Project is proposed on a 77.3 gross acre (66.3 net acre) site located south of Frank Sinatra Drive and west of Portola Avenue at Assessor Parcel Number (APN) 620-170-009. The Project site was previously operated as the Santa Rosa Country Club Golf Course from approximately 1978 until its closure in 2015.

The Project proposes the development of 546 single-family single- and two-story residences, onsite circulation, utility infrastructure, stormwater improvements, and open space areas. In the northwest portion of the site, the Project proposes 100 single-family units on 5,000-square foot lots. In the northeast portion, the Project proposes 43 six-pack clustered single-family units, for a total of 255 homes on lots ranging from 1,976 to 2,288 square feet. In the central portion, the Project proposes 88 single-family homes on 3,000-square foot lots. In the southern portion of the site would be developed with 103 single-family units on 4,050-square foot lots. There would be 15.4 acres of open space distributed throughout the site.

Construction of the project is estimated to begin in the December 2026 and to consist of three phases. The project is expected to begin operating in 2027 and to complete construction in December 2030.

On November 18, 2025, the Planning Commission approved the MND and the following entitlements: Precise Plan 25-0003 (PP25-0003); Master Infrastructure Map (TTM 39159); and Phased Subdivision Map (TTM 39160). SAFER timely appealed the Planning Commission's decision to the City Council.

LEGAL STANDARD FOR NEGATIVE DECLARATIONS

As the California Supreme Court held, “[i]f no EIR has been prepared for a nonexempt project, but substantial evidence in the record supports a fair argument that the project may result in significant adverse impacts, the proper remedy is to order preparation of an EIR.” (*Communities for a Better Env’t v. South Coast Air Quality Mgmt. Dist.* (2010) 48 Cal.4th 310, 319-20.) “Significant environmental effect” is defined very broadly as “a substantial or potentially substantial adverse change in the environment.” (Pub. Res. Code [“PRC”] § 21068; see also 14 CCR § 15382.) An effect on the environment need not be “momentous” to meet the CEQA test for significance; it is enough that the impacts are “not trivial.” (*No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 83.) “The ‘foremost principle’ in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the

environment within the reasonable scope of the statutory language.” (*Communities for a Better Env’t v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 109.)

The EIR is the very heart of CEQA. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1214 (*Bakersfield Citizens*); *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 927.) The EIR is an “environmental ‘alarm bell’ whose purpose is to alert the public and its responsible officials to environmental changes before they have reached the ecological points of no return.” (*Bakersfield Citizens, supra*, 124 Cal.App.4th at 1220.) The EIR also functions as a “document of accountability,” intended to “demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.” (*Laurel Heights Improvements Assn. v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 392.) The EIR process “protects not only the environment but also informed self-government.” (*Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 927.)

An EIR is required if “there is substantial evidence, in light of the whole record before the lead agency, that the project may have a significant effect on the environment.” (PRC § 21080(d); see also *Pocket Protectors, supra*, 124 Cal.App.4th at 927.) An MND instead of an EIR is proper only if project revisions would avoid or mitigate the potentially significant effects identified in the initial study “to a point where clearly no significant effect on the environment would occur, and . . . there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment.” (*Mejia v. City of Los Angeles* (2005) 130 Cal.App.4th 322, 331 [quoting PRC §§ 21064.5, 21080(c)(2)].) In that context, “may” means a reasonable possibility of a significant effect on the environment. (PRC §§ 21082.2(a), 21100, 21151(a); *Pocket Protectors, supra*, 124 Cal.App.4th at 927; *League for Protection of Oakland's etc. Historic Res. v. City of Oakland* (1997) 52 Cal.App.4th 896, 904-05.)

An EIR must be prepared rather than an MND “whenever it can be fairly argued on the basis of substantial evidence that the project may have a significant environmental impact.” (*No Oil, Inc. v City of Los Angeles* (1974) 13 Cal.3d 68, 75.) Under this “fair argument” standard, an EIR is required if any substantial evidence in the record indicates that a project may have an adverse environmental effect—even if contrary evidence exists to support the agency’s decision. (14 CCR § 15064(f)(1); *Pocket Protectors, supra*, 124 Cal.App.4th at 931; *Stanislaus Audubon Society v. County of Stanislaus* (1995) 33 Cal.App.4th 144, 150-51; *Quail Botanical Gardens Found., Inc. v. City of Encinitas* (1994) 29 Cal.App.4th 1597, 1602.) The “fair argument” standard creates a “low threshold” favoring environmental review through an EIR rather than through issuance of negative declarations or notices of exemption from CEQA. (*Pocket Protectors, supra*, 124 Cal.App.4th at 928.)

The “fair argument” standard is virtually the opposite of the typical deferential standard accorded to agencies. As a leading CEQA treatise explains:

This ‘fair argument’ standard is very different from the standard normally followed by public agencies in making administrative determinations. Ordinarily, public agencies weigh the evidence in the record before them and reach a decision based on a preponderance of the evidence. [Citations]. The fair argument standard, by contrast, prevents the lead agency from weighing competing evidence to determine who has a better argument concerning the likelihood or extent of a potential environmental impact. The lead agency’s decision is thus largely legal rather than factual; it does not resolve conflicts in the evidence but determines only whether substantial evidence exists in the record to support the prescribed fair argument.

(Kostka & Zishcke, *Practice Under CEQA*, §6.29, pp. 273-74.) The Courts have explained that “it is a question of law, not fact, whether a fair argument exists, and the courts owe no deference to the lead agency’s determination. Review is de novo, with a preference for resolving doubts in favor of environmental review.” (*Pocket Protectors*, *supra*, 124 Cal.App.4th at 928.)

DISCUSSION

I. An EIR is Required Due to a Fair Argument that the Project May Result in Significant Greenhouse Gas Impacts.

For analyzing greenhouse gas (“GHG”) impacts, CEQA allows either (1) a quantified analysis of GHG emissions resulting from a project; and/or (2) a qualitative analysis or reliance on performance-based standards. (14 CCR § 15064.4(a).) Under either method, there is a fair argument that the Project may result in significant GHG impacts. As a result, an EIR must be prepared to properly disclose, analyze, and mitigate the Project’s GHG impacts.

A. The Project’s annual GHG emissions exceed applicable significance thresholds.

Under a quantitative approach, there can be no doubt that the Project will result in a significant GHG impact. The MND plainly states that “the total amount of project-related GHG emissions from direct and indirect sources combined would total 10,393.21 MTCO₂e per year.” (DMND, p. 4-45.) As SAFER’s expert Dr. Rosenfeld explains, these GHG emissions vastly exceed the South Coast Air Quality Management District’s (“SCAQMD”) brightline significance threshold of 3,000 MTCO₂e per year. (Ex. A, pp. 8-9.) The MND’s claim that there is no applicable numerical significance threshold for GHG emissions is inaccurate. (See DMND, p. 4-43.) However, the court of appeal has recently upheld the use of SCAQMD’s 3,000 MTCO₂e threshold as a proper means of analyzing a project’s GHG impacts. (*Upland Community First v. City of Upland* (2024) 105 Cal.App.5th 1, 20-22 [“Substantial evidence shows that the 3,000 threshold is an appropriate numerical threshold for measuring the significance of the project’s GHG emissions.”].)

In addition to the 3,000 MTCO₂e threshold, Dr. Rosenfeld also compared the Project's GHG emissions to the SCAQMD 2035 service population efficiency target of 3.0 metric tons of carbon dioxide equivalents per service population per year ("MT CO₂e/SP/year"). (Ex. A, pp. 10-11.) Service population is defined as "the sum of the number of residents and the number of jobs supported by the project." (*Id.*, p. 10.) By dividing the Project's annual GHG emissions by a service population of 1,092 new residents, Dr. Rosenfeld found that the Project would emit approximately 9.5 MT CO₂e/SP/year, well in excess of the 3.0 MT CO₂e/SP/year threshold. (*Id.*, pp. 10-11.)

Because the Project's annual GHG emissions exceed SCAQMD's 3,000 MTCO₂e threshold and 3.0 MT CO₂e/SP/year threshold, there is a fair argument under the quantitative method that the Project will result in significant GHG impacts.

B. The Project is not consistent with plans adopted for the purpose of reducing GHG impacts.

Rather than applying the quantitative method, the MND takes a qualitative approach by evaluating the Project's consistency "with Statewide, regional, and local plans adopted for the purpose of reducing and/or mitigating GHG emissions." (DMND, p. 4-43.) The MND identifies three such plans: (1) California Air Resources Board ("CARB") 2022 Scoping Plan; (2) Southern California Association of Governments ("SCAG") 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy ("2020-2045 RTP/SCS"); and (3) applicable goals and policies from the City's General Plan. (DMND, p. 4-45.) The MND claims that the Project is consistent with all three plans and, as a result, concludes that the Project's GHG impacts will be less than significant. (DMND, p. 4-45 to -50.)

The MND's conclusion is incorrect because the Project is inconsistent with the CARB 2020 Scoping Plan. As noted in the MND, the 2020 Scoping Plan's standard for new residential and commercial development is "[a]ll electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030." (DMND, p. 4-46 [emph. added].) The MND claims that the Project is consistent with that standard, but then explains that all heating and cooking will be fueled by natural gas:

The project is expected to consist of natural gas heating and/or cooking on-site. The City of Palm Desert has not adopted an ordinance or program limiting the use of natural gas for on-site cooking and/or heating. However, if adopted, the project would comply with the applicable goals or policies limiting the use of natural gas equipment in the future. Furthermore, the project would install energy efficient appliances.

(*Id.*) The Project is plainly inconsistent with the 2020 Scoping Plan due to its reliance on natural gas appliances. Natural gas appliances for heating and cooking are clearly inconsistent with the Scoping Plan's vision for "[a]ll electric appliances beginning 2026" and "6 million heat pumps

installed statewide by 2030.” (*Id.*) It is immaterial that the City does not have an ordinance “limiting the use of natural gas for on-site cooking and/or heating.” (See *id.*) The relevant question is whether the Project, as proposed, is consistent with the 2020 Scoping Plan.

Because the Project’s reliance on natural gas is clearly inconsistent with the 2020 Scoping Plan, the MND’s conclusion that the Project’s GHG impacts will be less than significant is unfounded. Because the Project is inconsistent with an applicable GHG-reduction plan and, as discussed above, exceeds numerical GHG significance thresholds, there is a fair argument that the Project may result in significant GHG impacts. As a result, the City must prepare an EIR for the Project to properly disclose, analyze, and mitigate GHG impacts prior to further consideration of this Project.

II. An EIR is Required Due to a Fair Argument that the Project May Result in Significant Impacts to Biological Resources.

Expert wildlife biologist Dr. Shawn Smallwood, Ph.D., found several deficiencies in the MND’s analysis of the Project’s impacts to wildlife. Dr. Smallwood’s comment and CV are attached as Exhibit B. As discussed below, Dr. Smallwood concluded: (1) the MND failed to accurately assess baseline conditions for wildlife at the Project site; (2) the MND failed to assess or mitigate the Project’s potentially significant impacts to wildlife from habitat loss, movement impacts, traffic-wildlife collisions, bird-window collisions, house cat predation, and cumulative impacts.; and (4) the MND’s mitigation measures are inadequate.

A. The MND fails to adequately assess the baseline conditions for biological resources on the Project site. .

Dr. Smallwood’s associate, Noriko Smallwood, a wildlife biologist with an M.S. degree from California State University Los Angeles, visited the Project site to survey wildlife during daytime and nighttime on November 5 and 6, 2025 (Ex. B, p. 2.) During those visits, Ms. Smallwood “walked the site’s perimeter where accessible, stopping to scan for wildlife with use of binoculars. At night, [she] strapped a Pettersson M500 acoustic bat detector to a 10-foot pole, and cabled the detector to her computer, which ran Sonobat Live.” (*Id.*) Ms. Smallwood detected thirty-three (33) different vertebrate species, ten (10) of which Dr. Smallwood has determined are “special status” species. (Ex. B, p. 3.) These special status species include: (1) Costa’s hummingbird (USFWS Bird of Conservation Concern); (2) American kestrel (Bird of Prey); (3) Peregrine falcon (Bird of Prey); and (4) Verdin (USFWS Bird of Conservation Concern). Ms. Smallwood also detected either a spotted bat (California Species of Special Concern) or hoary bat (Western Bat Working Group- Moderate). (Ex. B, pp. 7-8.)

In contrast, the surveys conducted for the MND detected only twelve (12) species total, none of which the MND found to be “special status.” (Ex. B, p. 12.) The fact that the MND’s surveys detected a fraction of the species detected by Ms. Smallwood (and failed to detect a single special-status species) underscores the inadequacy of the MND’s analysis and the need for

an EIR with more robust surveys. (See *id.*, pp. 12-13.) Indeed, Dr. Smallwood calculated that more thorough site visits would reveal an even greater diversity of wildlife. (*Id.*, pp. 9-11.) Given more time to survey the site, Dr. Smallwood's predicts that upwards of 113 species of wildlife, including 29 special-status wildlife species, would be observed on site. (*Id.*, p. 11.) Based on his review of the MND and the site visits, Dr. Smallwood concluded, "the project site is indicative of a relatively species-rich wildlife community that warrants a serious survey effort." (*Id.*)

Dr. Smallwood's concerns were also raised by the California Department of Fish and Wildlife ("CDFW"), who similarly commented:

Compliance with CEQA is predicated on a complete and accurate description of the environmental setting that may be affected by the proposed Project. CDFW is concerned that the assessment of the existing environmental setting has not been adequately analyzed in the MND. CDFW is concerned that without a complete and accurate description of the existing environmental setting, the MND may provide an incomplete analysis of Project-related environmental impacts.

(FMND, p. 146.) In response to CDFW's concerns, the Final MND merely points to information in the Draft MND, which is the same information that CDFW found to be inadequate. (See FMND, p. 4-7; see also Ex. B, p. 37.) Both CDFW, an expert agency, and Dr. Smallwood, an expert ecologist, have determined that the MND failed to perform adequate studies to accurately determine the baseline conditions at the Project site. The City must ensure that proper biological studies are conducted either in a revised MND or an EIR prior to concluding that the Project's impacts will be less than significant.

In addition to the MND's inadequate wildlife surveys, the MND's review of available wildlife databases to identify which species are known to have occurred at or near the Project site was inadequate. (Ex. B, pp. 15-24.) The MND relied on the California Natural Diversity Data Base ("CNDDDB") to determine which species have potential to occur in the Project area. (*Id.*, p. 16.) However, as Dr. Smallwood explains:

By querying the CNDDDB to establish the pool of special-status species for analysis of occurrence likelihoods, [the MND] screened out many special-status species from further consideration in the characterization of the wildlife community as part of the existing environmental setting. The CNDDDB is not designed to support absence determinations or to screen out species from characterization of a site's wildlife community.

...

Furthermore, the CNDDDB is interested only in the findings of special-status species, which means that species more recently assigned special status will have been reported many fewer times to the CNDDDB than were species assigned special status since the inception of the CNDDDB. Therefore, occurrence records in the CNDDDB are most abundant for species assigned special status decades ago, but

fewest for species only recently assigned special status. And because negative findings are not reported to the CNDDDB, the CNDDDB is also inappropriate as a basis for weighting occurrence likelihoods such as absent, not expected, unlikely, low, moderate or high. Whereas the CNDDDB can be confirmatory of species presence, it cannot support absence determinations or assignments of low likelihood of occurrence.

(*Id.*)

Based on available databases (including CNDDDB, iNaturalist, and eBird) and site visits, Dr. Smallwood found that “146 special-status species of wildlife are known to occur near enough to the site to warrant analysis of occurrence potential.” (Ex. B, p. 23.) The MND’s Biological Report only analyzed the occurrence potential for 28 special-status species, which amounts to only 19% of the special-status species identified by Dr. Smallwood. (*Id.*, p. 24.) Therefore, the MND screened out 118 of the special-status species known to occur at or near the Project site from further review. (*Id.*) For the 28 special-status species that were analyzed, the MND claims that all the species are not expected to occur, even though “two of those species have been documented within 1.5 miles of the site, and another four of those species have been documented between 1.5 and 4 miles of the site.” (*Id.*) Further analysis is needed in a revised MND or EIR to address possible impacts to those species before determining that the Project will not result in significant impacts.

B. The MND failed to disclose and mitigate the Project’s impacts on habitat loss, wildlife movement, road mortality, and cumulative impacts.

Dr. Smallwood found that the MND failed to adequately discuss numerous significant impacts that the Project may have on biological resources, including habitat loss, wildlife movement, traffic-wildlife collisions, bird-window collisions, cat predation, and cumulative impacts. (Ex. B, pp. 27-37.) Dr. Smallwood’s analysis of the impacts to wildlife constitutes a fair argument that the Project may have significant unmitigated impacts. As such, an EIR is required prior to approval of the Project.

1. Habitat loss and fragmentation

The MND failed to account for the reduction in productive capacity for wildlife that will result from habitat loss. As Dr. Smallwood explains, “The site is proven to serve as habitat to at least 35 species of vertebrate wildlife.” (Ex. B, p. 26.) Dr. Smallwood calculates that the Project site contains approximately 289 nest sites for birds. (*Id.*, p. 27.)

As a result of habitat loss and fragmentation from the Project, Dr. Smallwood predicts that the loss of 289 nest sites corresponds to 1,166 fewer fledglings per year and an overall loss of 1,311 birds per year, most of which are protected by the federal Migratory Bird Treaty Act and California’s Migratory Bird Protection Act. (Ex. B, p. 27.) Dr. Smallwood concludes that

“[t]he loss of 1,311 birds would easily qualify as an unmitigated significant impact.” (*Id.*) Dr. Smallwood’s analysis establishes a fair argument that an EIR is required for the Project, not an MND.

2. Wildlife Movement

The MND failed to adequately assess the Project’s impacts on wildlife movement. (Ex. B, pp. 27-28.) The MND claims that the Project site “offers no connectivity to any natural habitats that would serve as migration corridors, nor do adjacent areas. No impact to native wildlife movement or wildlife corridors would occur.” (DMND, p. 4-22.) However, Dr. Smallwood explains,

[W]hether the site serves as a wildlife movement corridor is not the only consideration when it comes to the standard CEQA Checklist question of whether the project would interfere with wildlife movement in the region. The primary phrase of the CEQA standard goes to wildlife movement regardless of whether the movement is channeled by a corridor. Wildlife are obviously using the site, so they are able to travel to and from the site. Most of the birds recorded at the site are migratory birds, and the site is one of the last remaining patches of open space available to birds that need to move through the region.

(Ex. B, p. 28.) By focusing on “the red-herring question of whether the site occurs within a movement corridor,” the MND ignores that the species “detected on the project site had at some point moved to the site. . . . At minimum, the project site provides wildlife with stopover opportunities during migration or dispersal of young.” (*Id.*, p. 27.)

Furthermore, the MND did not include any study design or specific field method to quantify or characterize wildlife movement across the project site. (Ex. B, p. 28.) Dr. Smallwood explains:

A simple program of observation, for example, would have been to perform timed surveys on stations located at intervals across the site, and to have had observers plot wildlife travel paths on handheld maps. Another would be to use a thermal-imaging camera to track and record animal movements at night, including terrestrial mammals, birds and bats. But [the MND] reports nothing like these types of observations, and its analysis of wildlife movement and whether the project would interfere with it is therefore limited to speculation.

(*Id.*) By failing to properly assess the Project’s impacts on wildlife movement, the MND lacks substantial evidence to conclude that movement impacts will be less than significant.

3. Traffic-Wildlife Collisions

The MND fails to address the impacts to wildlife from collisions with traffic generated by the Project. This omission is important because, as Dr. Smallwood explains,

Vehicle collisions have accounted for the deaths of many thousands of amphibian, reptile, mammal, bird, and arthropod fauna, and the impacts have often been found to be significant at the population level (Forman et al. 2003). Across North America traffic impacts have taken devastating tolls on wildlife (Forman et al. 2003). In Canada, 3,562 birds were estimated killed per 100 km of road per year (Bishop and Brogan 2013), and the US estimate of avian mortality on roads is 2,200 to 8,405 deaths per 100 km per year, or 89 million to 340 million total per year (Loss et al. 2014). Local impacts can be more intense than nationally.

(Ex. B, p. 28.) According to the MND, the Project would result in 22,304,455 annual vehicle miles traveled (“VMT”). (*Id.*, p. 31.) Based on the Project’s annual VMT, Dr. Smallwood estimates that traffic from the Project will kill at least 1,401 vertebrates annually. (*Id.*, p. 32.) Especially due to the special-status species occurring and likely to occur at or near the Project, these collisions represent a significant impact to wildlife that must addressed, discussed, and mitigated in a revised MND or EIR.

3. Bird-Window Collisions.

The MND fails to account for the impact to bird species from collisions with the Project’s glass windows. The impacts from window collisions are important because such collisions “are often characterized as either the second or third largest source of human-caused bird mortality.” (Ex. B, p. 33.) Dr. Smallwood calculated that the Project would result in **1,182 bird deaths per year** due to collisions with the Project’s windows. (*Id.*, p. 35.) Dr. Smallwood concludes that “a fair argument can be made for the need to prepare an EIR to appropriately analyze the project for its potential impacts to birds caused by collisions with windows.” (*Id.*)

4. House Cat Predation

The MND fails to account for the impact to wildlife from the introduction of domestic cats to the area. As Dr. Smallwood explains:

In 2012 there were 0.44 house cats per human in the USA, and 122 vertebrate animals were killed per cat, free-ranging members of which killed disproportionately larger numbers of vertebrate wildlife. The Air Quality and GHG chapter of the IS/MND predicts there would be 1,764 new residents in 546 residential units .. ***The above rates of cat ownership applied to this number of new residents would predict 776 new cats, which based on the findings of Loss et al. (2013) would kill 94,672 vertebrate wildlife per year.***

(Ex. B, p. 36.)

Furthermore, cats introduce *Toxoplasma gondii*, which is “a parasite that can infect virtually all warm-blooded animals.” (Ex. B, p. 39.) *Toxoplasma gondii* can cause toxoplasmosis, which in severe cases can damage the brain, eyes, or other organs. (Center For Disease Control, About Toxoplasmosis, <https://www.cdc.gov/toxoplasmosis/about/index.html>.) Additionally, “[i]nfants infected [by *Toxoplasma gondii*] while still in the womb often have no symptoms at birth but can develop symptoms later in life.” (*Id.*)

Dr. Smallwood concludes that “[i]mpacts to wildlife from the introduction of house cats into the environment would be highly significant, and yet these impacts are not considered in the IS/MND.” (Ex. B, p. 36.) An EIR should be prepared that addresses this impact and to consider whether mitigating this impact is feasible through requirements on future residents constraining house cat ownership by, for example, requiring cats to remain indoors. (*Id.*)

5. Cumulative Impacts

The MND’s analysis of cumulative impacts to biological resources is fundamentally flawed for not meeting the requirements of CEQA. As required by the CEQA Guidelines,

The following elements are necessary to an adequate discussion of significant cumulative impacts: (1) Either:

(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

(B) A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency.

(14 CCR § 15130(b).

The MND is fundamentally deficient in its cumulative impact analysis because the MND contains neither a list of past, present, and probable future projects nor a summary of projections contained in an adopted local, regional or statewide plan, or related planning document. Instead, the MND claims that because Project-level impacts are less than significant, then cumulative impacts are also less than significant. (DMND, p. 4-106.) Such a conclusion ignores that cumulative impacts may result from individually minor but collectively significant projects

taking place over a period of time.(14 CCR § 15355(b).) Because the MND’s cumulative impact analysis is fundamentally deficient, it cannot be relied up to conclude that the Project’s cumulative impacts will be less than significant.

D. The MND’s proposed mitigation measures for biological resources are inadequate.

CDFW reviewed the Draft MND and concluded that five (5) additional or revised mitigation measures were necessary to reduce the Project’s impacts to less-than-significant levels. The Final MND adopted three (3) of CDFW’s suggested mitigation measures (nesting bird avoidance, bat surveys, and bat roost avoidance) but declined to adopt CDFW’s suggested mitigation for burrowing owls and artificial lighting. (FMND, pp. 2-28 to -34.)

The MND’s failure to adopt CDFW’s suggested burrowing owl mitigation is concerning. CDFW’s suggested mitigation measure consisted of two elements: (1) focused burrowing owl surveys conducted by a CDFW-approved qualified biologist and (2) pre-construction burrowing owl surveys conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance. (FMND, pp. 151-52.) The FMND claims that focused surveys are not needed because prior non-focused survey for the MND did not detect burrowing owl. However, the MND’s survey objectives “did not mention burrowing owl. The response to CDFW’s comment claims that the survey was focused on burrowing owl, but that is not what [the MND’s biological survey] states as one of its objectives. Furthermore, the survey was started at noon, which is the worst time for surveying for burrowing owls, especially over winter months. Finally, survey personnel covered 77.8 acres in four hours, or 19.45 acres/hour while pursuing multiple other stated objectives. Added to this is the potential habitat area to the east, which as CDFW points out, should have been surveyed as well.” (Ex. B, p. 38.) Because the FMND declined to adopt CDFW’s mitigation measure for focused surveys, there is a fair argument that the Project may have significant impacts on the burrowing owl left unaddressed by the MND.

For the pre-construction burrowing owl surveys, the FMND claims that “[t]he Applicant commits to the portion of the revised mitigation measure related to preconstruction burrowing owl surveys.” (FMND, p. 2-32.) However, in the FMND’s Mitigation Monitoring and Reporting Program (“MMRP”), Mitigation Measure BIO-3 remains unchanged. (FMND , pp. 4-5 to -6.) According to the FMND, BIO-3 reads as follows:

Within 30 days prior to any ground disturbing activities, a burrowing owl pre-construction survey shall be conducted by a qualified biologist to determine the presence/absence of burrowing owls on the project site and within a 500-foot buffer. Walking transects will be spaced no greater than 30 meters apart to ensure 100 percent visual coverage of the survey area. The location of all burrowing owls or burrows with burrowing owl sign shall be recorded and mapped. A written report documenting the survey shall be prepared following the survey. If burrowing owl

individuals or burrowing owl sign are detected during the pre-construction survey, then CDFW shall be notified to discuss appropriate avoidance measures. If avoidance is not feasible, a Burrowing Owl Mitigation and Monitoring Plan (BOMMP) shall be developed to ensure there are no direct impacts on burrowing owl. The BOMMP shall be approved by CDFW prior to project implementation.

(*Id.*) However, CDFW's suggested mitigation measure BIO-3 was:

Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be repeated when there is a pause in construction of more than 30 days. Preconstruction surveys shall be performed by a CDFW-approved qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted and the qualified biologist shall coordinate with CDFW and USFWS. Project activities shall not recommence until consultation with CDFW and USFWS is completed.

(FMND, p. 152.) If, in fact, the Applicant is committing to CDFW's recommended measure for pre-construction burrowing owl surveys, the MMRP must be revised prior to approval of the Project. If the MMRP is not revised, then CDFW's comment provides a fair argument that the Project may result in significant impacts to the burrowing owl. (See Ex. B, p. 45.)

Dr. Smallwood also suggests additional mitigation measures that must be applied to this Project to ensure that impacts to biological resources are minimized to the extent possible, including adherence to available Bird-Safe Guidelines, such as those prepared by American Bird Conservancy New York, and San Francisco, and compensatory monetary mitigation for wildlife rehabilitation, especially for species not covered by the Coachella Valley Multiple Species Habitat Conservation Plan. (Ex. B, pp. 45-47.)

III. The MND's Air Quality Analysis Is Not Supported by Substantial Evidence.

Dr. Rosenfeld found that the MND underestimated the Project's emissions and therefore cannot be relied upon to determine the significance of the Project's air quality impacts. (Ex. A, pp. 1-8.) To estimate the Project's emissions, the MND utilized the California Emissions Estimator Model ("CalEEMod"). CalEEMod relies on recommended default values based on site specific information related to a number of factors. CEQA requires that any changes to the default values must be justified by substantial evidence.

Dr. Rosenfeld reviewed the Project's CalEEMod output files and found that the values input into the model were inconsistent with information provided in the MND, resulting in an

underestimation of the Project's emissions. (Ex. A, pp. 1-8.) As a result, the MND lacks substantial evidence to conclude that impacts will be less than significant.

Specifically, Dr. Rosenfeld found that the following values used in the MND's air quality analysis were either inconsistent with information provided in the MND or otherwise unjustified:

1. Unsubstantiated changes to construction phase lengths (Ex. A, pp. 1-3.)
2. Incorrect amount of material import and export (Ex. A, pp. 3-4.)
3. Unsubstantiated changes to architectural coating factors (Ex. A, pp. 4-5.)
4. Unsubstantiated changes to number of hearths (Ex. A, pp. 5-6.)
5. Incorrect construction hauling trip length (Ex. B, pp. 6-8).

As a result of these errors, the MND underestimates the Project's construction and operational emissions and cannot be relied upon to determine the significance of the Project's air quality impacts.

IV. An EIR is Required Due to a Fair Argument that the Project May Result in Significant Impacts to Indoor Air Quality.

The MND fails to discuss, disclose, analyze, and mitigate the significant health risks posed by the Project from formaldehyde, a toxic air contaminant ("TAC"). Certified Industrial Hygienist, Francis Offermann, PE, CIH, has conducted a review of the Project, attached as Exhibit C. Mr. Offermann is one of the world's leading experts on indoor air quality, in particular emissions of formaldehyde, and has published extensively on the topic. As discussed below and set forth in Mr. Offermann's comments, the Project's emissions of formaldehyde will result in significant cancer risks to the Project's future residents. Mr. Offermann's expert opinion demonstrates the Project's significant health risk impacts, which the City has a duty to investigate, disclose, and mitigate in an EIR, not an MND.

Formaldehyde is a known human carcinogen and listed by the State of California as a TAC. SCAQMD has established a significance threshold of health risks for carcinogenic TACs of 10 in a million (Ex. C, p. 2.). The MND fails to acknowledge the significant indoor air emissions that will result from the Project. Specifically, there is no discussion of impacts or health risks, no analysis, and no identification of mitigations for the Project's significant emissions of formaldehyde.

Mr. Offermann explains that many composite wood products typically used in home and apartment building construction contain formaldehyde-based glues which off-gas formaldehyde. He states, "The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particle board. These materials are commonly used in residential, office, and retail building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims." (Ex. C, p. 2.)

Mr. Offermann found that future residents of the Project's residential units will be exposed to a cancer risk from formaldehyde of approximately 120 per million, ***even assuming that*** all materials are compliant with the California Air Resources Board's formaldehyde airborne toxics control measure. (Ex. C, p. 4.) This is more than 12 times SCAQMD's CEQA significance threshold of 10 per million. (*Id.*)

Mr. Offermann concludes that this significant environmental impact must be analyzed in an EIR and mitigation measures should be imposed to reduce the risk of formaldehyde exposure. (Ex. C, pp. 5, 11-13.) He prescribes a methodology for estimating the Project's formaldehyde emissions in order to do a more project-specific health risk assessment. (*Id.*, pp. 5-9). Mr. Offermann also suggests several feasible mitigation measures, such as requiring the use of no-added-formaldehyde composite wood products, which are readily available. (*Id.*, pp. 11-12.) Mr. Offermann also suggests requiring air ventilation systems which would reduce formaldehyde levels. (*Id.*, p. 12.) Since the EIR does not analyze this impact at all, none of these or other mitigation measures have been considered.

When a Project exceeds a duly adopted CEQA significance threshold, as here, this alone establishes substantial evidence that the project will have a significant adverse environmental impact. Indeed, in many instances, such air quality thresholds are the only criteria reviewed and treated as dispositive in evaluating the significance of a project's air quality impacts. (See, e.g. *Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 960 [County applies Air District's "published CEQA quantitative criteria" and "threshold level of cumulative significance"]; see also *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 110-111 ["A 'threshold of significance' for a given environmental effect is simply that level at which the lead agency finds the effects of the project to be significant"].)

The California Supreme Court made clear the substantial importance that an air district significance threshold plays in providing substantial evidence of a significant adverse impact. (*Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 327.) Since expert evidence demonstrates that the Project will exceed the SCAQMD's CEQA significance threshold, there is substantial evidence that an "unstudied, ***potentially significant environmental effect***[]" exists. (See *Friends of Coll. of San Mateo Gardens v. San Mateo Cty. Cmty. Coll. Dist.* (2016) 1 Cal.5th 937, 958 [emphasis added].)

The failure of the MND to address the Project's formaldehyde emissions is contrary to the California Supreme Court's decision in *California Building Industry Ass'n v. Bay Area Air Quality Mgmt. Dist.* (2015) 62 Cal.4th 369, 386 (*CBLA*). In that case, the Supreme Court expressly holds that potential adverse impacts to future users and residents from pollution generated by a proposed project ***must be addressed*** under CEQA. At issue in *CBLA* was whether the Air District could enact CEQA guidelines that advised lead agencies that they must analyze the impacts of adjacent environmental conditions on a project. The Supreme Court held that CEQA does not generally require lead agencies to consider the environment's effects on a

project. (*CBLA*, 62 Cal.4th at 800-01.) However, to the extent a project may exacerbate existing environmental conditions at or near a project site, those would still have to be considered pursuant to CEQA. (*Id.* at 801.) In so holding, the Court expressly held that CEQA’s statutory language required lead agencies to disclose and analyze “impacts on ***a project’s users or residents*** that arise ***from the project’s effects*** on the environment.” (*Id.* at 800 [emphasis added].)

The carcinogenic formaldehyde emissions identified by Mr. Offermann are not an existing environmental condition. Those emissions to the air will be from the Project. People will be residing in the Project’s residences once built and emitting formaldehyde. Once built, the Project will begin to emit formaldehyde at levels that pose significant direct and cumulative health risks. The Supreme Court in *CBLA* expressly finds that this type of air emission and health impact by the project on the environment and a “project’s users and residents” must be addressed in the CEQA process. The existing TAC sources near the Project site would have to be considered in evaluating the cumulative effect on future residents of both the Project’s TAC emissions as well as those existing off-site emissions.

The Supreme Court’s reasoning is well-grounded in CEQA’s statutory language. CEQA expressly includes a project’s effects on human beings as an effect on the environment that must be addressed in an environmental review. “Section 21083(b)(3)’s express language, for example, requires a finding of a ‘significant effect on the environment’ (§ 21083(b)) whenever the ‘environmental effects of a project will cause substantial adverse effects *on human beings*, either directly or indirectly.” (*CBLA*, 62 Cal.4th at 800.) Likewise, “the Legislature has made clear—in declarations accompanying CEQA’s enactment—that public health and safety are of great importance in the statutory scheme.” (*Id.* [citing e.g., PRC §§ 21000, 21001].) It goes without saying that the future residents of the Project are human beings and their health and safety must be subject to CEQA’s safeguards.

The City has a duty to investigate issues relating to a project’s potential environmental impacts. (*See County Sanitation Dist. No. 2 v. County of Kern*, (2005) 127 Cal.App.4th 1544, 1597–98. [“[U]nder CEQA, the lead agency bears a burden to investigate potential environmental impacts.”].) The proposed buildings will have significant impacts on air quality and health risks by emitting cancer-causing levels of formaldehyde into the air that will expose future residents to cancer risks potentially in excess of SCAQMD’s significance threshold for cancer health risks of 10 in a million. Currently, outside of Mr. Offermann’s comments, the City does not have any idea what risks will be posed by formaldehyde emissions from the Project. As a result, the City must include an analysis and discussion in an EIR which discloses and analyzes the health risks that the Project’s formaldehyde emissions may have on future residents and identifies appropriate mitigation measures.

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CONCLUSION

SAFER and its experts have established a fair argument that the Project may have significant impacts related to greenhouse gases, biological resources, and indoor air quality. Furthermore, the MND failed to provide substantial evidence to support its conclusions regarding the Project's impacts to greenhouse gases, air quality, and biological resources. For those reasons, SAFER respectfully requests that the City Council grant SAFER's appeal and direct planning staff to prepare an EIR prior to further consideration of this Project. .

Sincerely,



Brian B. Flynn
Lozeau Drury LLP

EXHIBIT A



Technical Consultation, Data Analysis and
Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

Matt Hagemann, P.G., C.Hg.
(949) 887-9013
mhagemann@swape.com

November 26, 2025

Richard Drury
Lozeau | Drury LLP
1939 Harrison St., Suite 150
Oakland, CA 94612

Subject: Comments on the Catavina Residential Development Project (SCH No. 2025091375)

Dear Mr. Drury,

We have reviewed the September 2025 Initial Study/Mitigated Negative Declaration ("IS/MND") for the Catavina Residential Development Project ("Project") located in the City of Palm Desert ("City"). The Project proposes to construct 546 residences, onsite circulation, utility infrastructure, stormwater improvements, and open space areas on the 77.3-acre site.

Our review concludes that the IS/MND fails to adequately evaluate the Project's air quality and greenhouse gas impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project may be underestimated and inadequately addressed. An Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential air quality and greenhouse gas impacts that the project may have on the environment.

Air Quality

Unsubstantiated Input Parameters Used to Estimate Project Emissions

When reviewing the Project's CalEEMod output files, provided in the Air Quality/Greenhouse Gas/Energy Modeling Results ("AQ Study") provided as Appendix A to the IS/MND, we identified several model inputs related to Project construction that are inconsistent with information disclosed in the IS/MND. An EIR should be prepared to include an updated air quality analysis that provides a more detailed evaluation of the impact that construction and operation of the Project may have on local and regional air quality.

Unsubstantiated Changes to Individual Construction Phase Lengths

The "Catavina Residential Phase 1 Detailed Report," "Catavina Residential Phase 2 and Phase 3 Detailed Report," and "Catavina Residential Phase 4 and Phase 5 Detailed Report" models alter the default

construction phase lengths and include the following construction schedules, respectively (see screenshots below) (Appendix A, pp. 71, 134, 192).

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	12/1/2026	12/30/2026	5.00	22.0	—
Grading	Grading	12/1/2026	3/2/2027	5.00	66.0	—
Paving	Paving	5/1/2027	6/1/2027	5.00	22.0	—

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Grading	Grading	7/1/2027	7/30/2027	5.00	22.0	—
Building Construction	Building Construction	11/1/2027	8/12/2030	5.00	726	—
Paving	Paving	09/1/2027	9/30/2027	5.00	22.0	—
Architectural Coating	Architectural Coating	10/1/2027	4/11/2030	5.00	660	—

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Grading	Grading	7/1/2027	7/30/2027	5.00	22.0	—
Building Construction	Building Construction	02/1/2028	11/12/2030	5.00	726	—
Paving	Paving	12/1/2027	12/30/2027	5.00	22.0	—
Architectural Coating	Architectural Coating	05/1/2028	11/8/2030	5.00	660	—

The CalEEMod User’s Guide requires any changes to model defaults be justified.¹ The justification provided for these changes are:

“Per Applicant provide information Phase 1 is the master backbone improvements. Grading represents the approximate rough grading of the entire site”

and

“Per Applicant provided information 22 work days per month,” respectively (Appendix A, pp. 82, 146, 203).

Regarding the construction schedule, the IS/MND states:

“Construction of the project is estimated to begin in the December 2026 and consist of three phases: Phase I – Backbone; Phase 2 and 3 – Southern Half; and Phase 4 and 5 – Northern Half. The project is expected to begin operating in 2027 and to complete construction in December 2030” (p. 2-5).

However, the construction schedules in the models remain unsupported.

While the IS/MND justifies the total construction duration of approximately 4 years, beginning in 2026 and ending in 2030, the IS/MND fails to disclose the duration of the three discrete construction phases. Moreover, the IS/MND fails to discuss the lengths of the *individual* construction phase lengths (e.g., demolition, grading, building construction, and architectural coating) whatsoever. According to the CalEEMod User’s Guide:

¹ “CalEEMod User Guide.” CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 13, 14.

“CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, provided that the information is supported by substantial evidence as required by CEQA.”²

As the IS/MND fails to provide substantial evidence to support the revised individual construction phase lengths, we cannot verify the changes.

According to the CalEEMod User’s Guide, each individual construction phase (e.g., demolition, grading, building construction, and architectural coating) is associated with different emissions activities (see excerpt below).³

Table 3. CalEEMod Default Construction Phases^a

Phase Type	Description
NON-LINEAR LAND USE TYPES (VERTICAL CONSTRUCTION)	
Demolition	Involves removing buildings or structures.
Site Preparation	Involves clearing vegetation (grubbing and tree/stump removal) and removing stones and other unwanted material or debris prior to grading.
Grading	Involves the cut and fill of land to ensure that the proper base and slope is created for the foundation.
Building Construction	Involves the construction of the foundation, structures, and buildings.
Paving	Involves the laying of concrete or asphalt such as in parking lots, roads, driveways, or sidewalks.
Architectural Coating	Involves the application of coatings to both the interior and exterior of buildings or structures, the painting of parking lot or parking garage striping, associated signage and curbs, and the painting of the walls or other components such as stair railings inside parking structures.

By modifying the individual construction phase lengths, the model assumes there are more days to complete the construction activities required by the certain phases. The model therefore assumes fewer activities would be required per day for those phases and, consequently, less pollutants emitted per day. Until the construction phases are verified, the model may underestimate the peak daily emissions associated with certain construction activities.

Incorrect Amount of Material Export and Import

The IS/MND reveals that Project construction requires material import and export, stating:

“Project earthwork is estimated to include 166,962 cubic yards of cut and 109,730 cubic yards of fill, with 7,536 cubic yards of export” (p. 15).

Accordingly, review of the CalEEMod output files demonstrates that the “Catavina Residential Phase 1 Detailed Report” model includes 7,536 cubic yards (“cy”) of material export (see screenshot below) (Appendix A, pp. 74).

² “CalEEMod User Guide.” CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 10.

³ “CalEEMod User Guide.” CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 34, Table 3.

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	0.00	—
Grading	0.00	7,536	198	0.00	—
Paving	0.00	0.00	0.00	0.00	6.02

However, while the IS/MND states that the Project would require 7,536-cy of export, the IS/MND fails to account for the net imbalance between the total cut and fill required for construction, which results in 57,232-cy of material export needing to be hauled away from the Project site.⁴ As a result, the IS/MND and model therefore underestimate the amount of material export generated by Project construction by 49,696-cy.⁵

The inclusion of material import and export within the model is required to calculate emissions produced from material movement, including truck loading and unloading, and additional hauling truck trips.⁶ By underestimating the amount of material export required for Project construction, the model underestimates the Project's construction-related emissions and should not be relied upon to determine Project significance. An EIR should be prepared to provide an updated air quality analysis.

Unsubstantiated Changes to Architectural Coating Factors

The "Catavina Residential Full Buildout Detailed Report," "Catavina Residential Phase 2 and Phase 3 Detailed Report," and "Catavina Residential Phase 4 and Phase 5 Detailed Report" models include changes to the default architectural coating values (see screenshot below) (Appendix A, pp. 44, 146, 203).

Screen	Justification
Construction: Construction Phases	Per Applicant provided information 22 work days per month
Land Use	Per Project Description Per Applicant, Phase 2 and 3 comprise of construction of the southern half (South comprising of 100 units and Central comprising of 103 units) of the site. Phase 2 and 3 would construct 100 units on 4,050 SF lots Acreage based on Site Plan Default CalEEMod Building SF
Construction: Dust From Material Movement	Per Applicant provided info Site assumed to be balanced
Construction: Architectural Coatings	Per SCAQMD Rule 1113

As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.⁷ As demonstrated above in the "User Changes to Default Data" table, the justification provided for these changes is:

"Per SCAQMD Rule 1113" (Appendix A, pp. 44, 146, 203).

⁴ Calculated: 166,962-cy of required cut – 109,730-cy of required fill = 57,232-cy net required cut.

⁵ Calculated: 57,232-cy of required material export – 7,536-cy modeled material export = 49,696-cy underestimated material export.

⁶ "CalEEMod User Guide." CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 36, 38.

⁷ "CalEEMod User Guide." CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 13, 14.

These changes remain unsupported, as we cannot verify the accuracy of the revised architectural coating emission factors based on SCAQMD Rule 1113 alone.

The SCAQMD Rule 1113 Table of Standards provides the required VOC limits (grams of VOC per liter of coating) for 57 different coating categories.⁸ The VOC limits for each coating varies from a minimum value of 50 g/L to a maximum value of 730 g/L. As such, we cannot verify that SCAQMD Rule 1113 substantiates reductions to the default coating values without more information regarding what category of coating will be used. As the IS/MND and associated documents do not explicitly require the use of a specific type of coating which would adhere to a specific VOC limit, we are unable to verify the model's revised emission factors.

Additionally, the IS/MND does not directly mandate adherence to these standards through a formal mitigation measure. The Association of Environmental Professionals' ("AEP") recommends including project design features that address environmental impacts in the Mitigation Monitoring and Reporting Program ("MMRP").⁹ Without formal inclusion as mitigation measures, the use of low VOC coatings in compliance with Rule 1113 could be entirely omitted from the Project's design. As the IS/MND does not formally commit to implementing, monitoring, or enforcing the use of these coatings, the changes in the model are unfounded.

These reductions present an issue, as CalEEMod uses the architectural coating emission factors to calculate the Project's reactive organic gas/volatile organic compound ("ROG"/"VOC") emissions.¹⁰ By including unsupported reductions to the default architectural coating emission factors, the model may underestimate the Project's construction-related ROG/VOC emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to Number of Hearths

Review of the CalEEMod output files demonstrates that "Catavina Residential Full Buildout Detailed Report" model includes changes to the default number of hearths (see screenshot below) (Appendix A, pp. 43).

Screen	Justification
Construction: Construction Phases	Per Applicant provide information Phase 1 is the master backbone improvements. Grading represents the approximate rough grading of the entire site
Land Use	Per PD Project site is 77.8 acres Default Building SF Project landscaping is approximately 15.4 acres
Operations: Vehicle Data	Per Traffic Impact Study
Operations: Hearths	Per SCAQMD Rule 445

⁸ "SCAQMD Rule 1113 Advisory Notice." SCAQMD, February 2016, *available at*: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=24>, p. 1113-14, Table of Standards 1.

⁹ "CEQA Portal Topic Paper Mitigation Measures." AEP, February 2020, *available at*: <https://ceqaportal.org/downloadtp.cfm?file=CEQA+Mitigation+2020.pdf&token=94895525-C8C3-1E50-80A3B7D60BE9BA96>, p. 6, (membership required).

¹⁰ "CalEEMod User Guide." CAPCOA, April 2022, *available at*: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 7, 44.

However, the 'Hearths' section of the model does not disclose the quantitative changes that were made to the default hearth values (see screenshot below) (Appendix A, pp. 155).

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

As previously stated, the CalEEMod User's Guide requires any changes to model defaults be justified.¹¹ The justification provided for these changes are:

"Per SCAQMD Rule 445" (Appendix A, pp. 43).

The changes to the default number of hearths in the model remain unsupported. While SCAQMD Rule 445 prohibits the installation of wood-burning devices into new developments, it does not prohibit natural gas fireplaces or other gas-fueled appliances, which continue to be allowed.¹² The omission of wood-burning hearths is thus consistent with regulatory requirements; however, the Project may still utilize natural gas fireplaces. As the IS/MND does not mention the number or types of hearths proposed by the Project or included in the model, we are unable to verify the changes. As a result, the number of natural gas fireplaces may be reduced in the model without sufficient evidence.

This presents an issue, as CalEEMod uses the number of hearths to calculate the Project's area-source operational emissions.¹³ By including unsupported changes to the number of hearths, the model may underestimate the Project's area-source operational emissions and should not be relied upon to determine Project significance.

Incorrect Construction Hauling Trip Length

Review of the CalEEMod output files demonstrates that the "Catavina Residential Phase 1 Detailed Report" model includes the default 20-mile hauling trip length (see screenshot below) (Appendix A, pp. 73).

¹¹ "CalEEMod User Guide." CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 13, 14.

¹² "Rule 445." AQMD, September 2025, available at: <https://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-445.pdf>.

¹³ "CalEEMod User Guide." CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 47, 48.

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	14.3	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT

In regard to the landfill to be used by the Project, the IS/MND states:

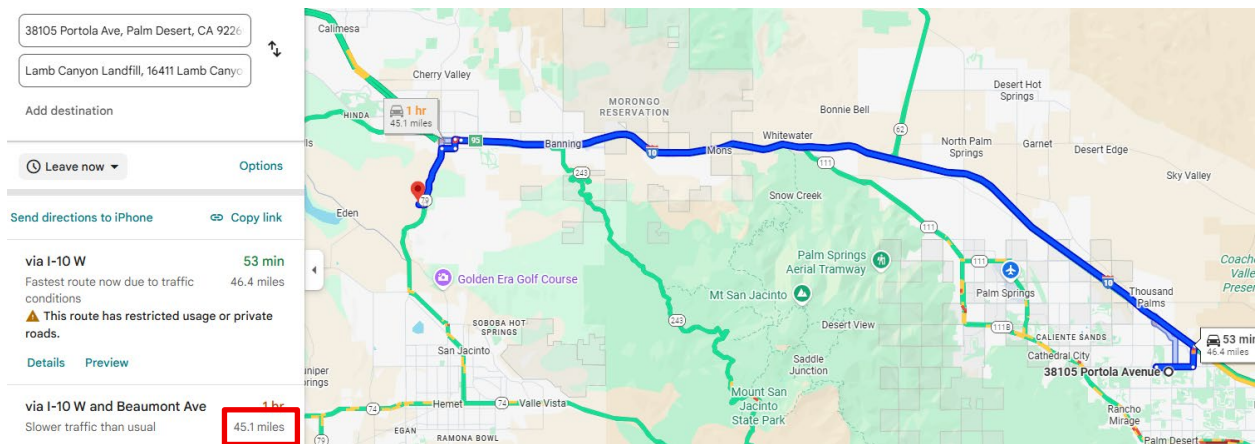
“Solid waste would be taken to an approved transfer facility and then transferred to an approved processing or disposal facility. As indicated in the City’s Franchise Agreement with Burrtec, there are four landfills serving the City” (p. 4-101).

The IS/MND provides a table identifying the four landfills that serve the City (see excerpt below) (p. 4-101).

**Table 4.19-1
Landfills Serving the City**

Landfill/Location	Amount Disposed by City in 2019 (tons/year)	Maximum Daily Throughput (tons per day)	Remaining Capacity (cubic yards)	Anticipated Closure Date
Lamb Canyon Sanitary Landfill 16411 State Hwy 79, Beaumont, CA 92223	61,401	5,000	19,242,950	4/1/2032
Badlands Sanitary Landfill 31125 Ironwood Ave, Moreno Valley, CA 92555	238	5,000	7,800,000	1/1/2059
Salton City Solid Waste Site 935 W. Highway 86, Salton City, CA 92275	1,443	6,000	62,540,915	12/31/2038
El Sobrante Landfill 10910 Dawson Canyon Rd, Corona, CA 91719	1,140	16,054	143,977,170	1/1/2051
Sources: 1. California Department of Resources Recycling and Recovery, <i>Jurisdiction Disposal by Facility With Reported Alternative Daily Cover (ADC) and Alternative Intermediate Cover (AIC)</i> , https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility , accessed January 13, 2025. 2. California Department of Resources Recycling and Recovery, <i>SWIS Facility/Site Search</i> , https://www2.calrecycle.ca.gov/SolidWaste/Site/Search , accessed January 13, 2025.				

However, a review of Google Maps reveals that the Lamb Canyon Sanitary Landfill is located approximately 45 miles from the Project site (see screenshot below).



The three alternative landfills that serve the City, including the Badlands Sanitary Landfill, the Salton City Solid Waste Site, and the El Sobrante Landfill, are located at comparable if not farther distances from the Project site. The 20-mile hauling trip route is therefore underestimated by 25 miles.

CalEEMod uses the hauling trips lengths to estimate the construction-related emissions associated with on-road vehicles.¹⁴ By including an underestimated hauling trip length, the model underestimates the Project’s construction-related emissions and should not be relied upon to determine Project significance.

Greenhouse Gas

Failure to Adequately Evaluate Greenhouse Gas Impacts

The IS/MND estimates that the Project would generate net annual greenhouse gas (“GHG”) emissions of 10,393.21 metric tons of carbon dioxide equivalents per year (“MT CO₂e/year”) (see excerpt below) (p. 4-44, Table 4.8-1).

¹⁴ “CalEEMod User Guide.” CAPCOA, April 2022, available at: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf, p. 13, 14.

**Table 4.8-1
Estimated Greenhouse Gas Emissions**

Estimated Greenhouse Gas Emissions					
Source	CO ₂ MT/year ¹	CH ₄ MT/year ¹	N ₂ O MT/year ¹	Refrigerants MT/year ¹	CO ₂ e MT/year ¹
Direct Emissions					
Construction (amortized over 30 years) ²	120.98	<0.01	<0.01	0.06	122.46
Area Source	6.76	<0.01	<0.01	0.00	6.79
Mobile Source	7,655.00	0.26	0.34	7.21	7,771.00
Refrigerants	0.00	0.00	0.00	1.26	1.26
<i>Total Direct Emissions³</i>	<i>7,781.81</i>	<i>0.26</i>	<i>0.34</i>	<i>8.53</i>	<i>7,901.51</i>
Indirect Emissions					
Energy	2,261.00	0.17	0.01	0.00	2,268.00
Solid Waste	44.60	4.46	0.00	0.00	156.00
Water Demand	44.40	0.72	0.02	0.00	67.70
<i>Total Indirect Emissions³</i>	<i>2,350.00</i>	<i>5.35</i>	<i>0.03</i>	<i>0.00</i>	<i>2,491.70</i>
Total Project-Related Emissions³	10,393.21 MTCO₂e/year				
Notes: MT/year = metric tons per year					
1. Emissions calculated using California Emissions Estimator Model Version 2022.1 (CalEEMod) computer model.					
2. Combined GHG emissions of the Catavina Residential Phases 1 through 5 construction CalEEMod runs.					
3. Totals may be slightly off due to rounding.					
Refer to Appendix A, for detailed model input/output data.					

However, the IS/MND does not utilize a quantitative analysis to evaluate the Project's GHG emissions. Rather, the IS/MND states:

“In summary, the project's characteristics render it consistent with Statewide, regional, and local climate change mandates, plans, policies, and recommendations. More specifically, the GHG plan consistency analysis provided above demonstrates that the project complies with the regulations and GHG reduction goals, policies, actions, and strategies outlined in the 2022 Scoping Plan, 2020-2045 RTP/SCS, and the City's General Plan. Consistency with these plans would reduce the impact of the project's incremental contribution of GHG emissions. Accordingly, the project would not conflict with any applicable plan, policy, regulation, or recommendation adopted for the purpose of reducing GHG emissions. Impacts in this regard would be less than significant” (p. 4-50–4-51).

As such, the IS/MND's analysis relies upon the applicable regulatory plans and policies to conclude that the Project would result in a less-than-significant GHG impact (p. 4-51). However, the IS/MND's analysis, as well as the subsequent less-than-significant impact conclusion, is unsupported.

In an effort to quantitatively evaluate the Project's GHG emissions, we compared the Project's GHG emissions, as estimated by the IS/MND, to the SCAQMD interim bright-line threshold of 3,000 MT CO₂e/year for the year 2020, which is commonly used in CEQA analyses.¹⁵ The guidance that provided the 3,000 MT CO₂e/year threshold, SCAQMD's 2008 *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans* report, was developed when the Global Warming Solutions Act of

¹⁵ “Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15.” SCAQMD, September 2010, available at: [http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-\(ghg\)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf](http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf), p. 2.

2006, commonly known as “AB 32”, was the governing statute for GHG reductions and required California to reduce GHG emissions to 1990 levels by 2020.¹⁶

As previously stated, the IS/MND estimates that the Project would generate net annual GHG emissions of 10,393.21 MT CO₂e/year (p. 4-44, Table 4.8-1). When applying this threshold, the Project’s air models indicate a potentially significant GHG impact (see table below).

IS/MND Annual Greenhouse Gas Emissions	
Proposed Project	GHG Emissions
Total Net Annual GHG Emissions (MT CO ₂ e/year)	10,393.21
SCAQMD Interim Threshold (MT CO ₂ e/year)	3,000
<i>Exceeds?</i>	Yes

As demonstrated above, the Project’s estimated annual GHG emissions exceed the SCAQMD interim threshold of 3,000 MT CO₂e/year, thus resulting in a significant impact not previously addressed or mitigated in the IS/MND.

Furthermore, we compared the Project’s GHG emissions, as estimated by the IS/MND, to the SCAQMD 2035 service population efficiency target of metric tons of carbon dioxide equivalents per service population per year (“MT CO₂e/SP/year”), which was calculated by applying a 40% reduction to the 2020 targets.¹⁷ According to CAPCOA’s *CEQA & Climate Change* report, a service population (“SP”) is defined as “the sum of the number of residents and the number of jobs supported by the project.”¹⁸ According to the IS/MND, the Project would introduce up to 1,092 new residents (p. 4-79). As the proposed Project only proposes residential land uses, we estimate a SP of 1,092 people. When dividing the Project’s net annual GHG emissions, as estimated by the IS/MND, by a SP of 1,092 people, we find that that the Project would emit approximately 9.5 MT CO₂e/SP/year (see table below).¹⁹

¹⁶ HEALTH & SAFETY CODE 38550, *available at*: https://leginfo.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC§ionNum=38550.

¹⁷ “Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15.” SCAQMD, September 2010, *available at*: [http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-\(ghg\)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf](http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf), p. 2.

¹⁸ “CEQA & Climate Change.” California Air Pollution Control Officers Association (CAPCOA), January 2008, *available at*: <http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf>, p. 71-72.

¹⁹ Calculated: (10,393.21 MT CO₂e/year) / (1,092 SP) = (9.5 MT CO₂e/SP/year).

IS/MND Service Population Efficiency Values	
Proposed Project	GHG Emissions
Total Net Annual GHG Emissions (MT CO ₂ e/year)	10,393.21
Service Population	1,092
Service Population Efficiency (MT CO ₂ e/SP/year)	9.5
SCAQMD Threshold	3.0
<i>Exceeds?</i>	Yes

As demonstrated above, the service population efficiency values for Project as estimated by the IS/MND's net annual GHG emissions estimates and SP, exceed the SCAQMD 2035 efficiency target of 3.0 MT CO₂e/SP/year, indicating a potentially significant impact not previously identified or addressed by the IS/MND. As a result, the IS/MND's less-than-significant GHG impact conclusion should not be relied upon. An EIR should be prepared, including an updated GHG analysis and incorporating additional mitigation measures to reduce the Project's GHG emissions to less-than-significant levels.

Mitigation

Feasible Mitigation Measures Available to Reduce Emissions

The IS/MND is required under CEQA to implement all feasible mitigation to reduce the Project's potential impacts. As demonstrated above, the Project would result in potentially significant air quality and GHG impacts that should be mitigated further.

To reduce the GHG emissions associated with the Project, we recommend several mitigation measures as listed below. The Southern California Association of Governments' Certified Final Program Environmental Impact Report for Connect SoCal 2024 recommends the following Project-level greenhouse gas quality mitigation measures:²⁰

- Integrate green building measures consistent with CALGreen (California Building Code Title 24), local building codes and other applicable laws, into project design including:
 - Use energy efficient materials in building design, construction, rehabilitation, and retrofit.
 - Install energy-efficient lighting, heating, and cooling systems (cogeneration); water heaters; appliances; equipment; and control systems beyond Title 24 minimum requirements.
 - Reduce lighting, heating, and cooling needs by taking advantage of light-colored roofs, trees for shade, and sunlight.
 - Incorporate passive environmental control systems that account for the characteristics of the natural environment.

²⁰ "Certified Final Program Environmental Impact Report for Connect SoCal 2024." SCAG, May 2020, *available at*: <https://scag.ca.gov/program-environmental-impact-report-0>.

- Use high-efficiency lighting and cooking devices.
- Incorporate passive solar design.
- Use high-reflectivity building materials and multiple glazing.
- Use no gas-powered landscape maintenance equipment.
- Install alternative fuel (i.e., electric, hydrogen-fueled, etc.) vehicle charging and fueling stations.
- Encourage projects to reduce natural gas infrastructure in buildings and/or reduce the use of natural gas appliances, with exceptions for limited uses.
- Measures that encourage transit use, carpooling, bike-share and car-share programs, active transportation, and parking strategies, including, but not limited to the following:
 - Promote transit-active transportation coordinated strategies.
 - Increase bicycle carrying capacity on transit and rail vehicles.
 - Improve or increase access to transit.
 - Increase access to common goods and services, such as groceries, schools, day care, and medical care.
 - Incorporate the neighborhood electric vehicle network.
 - Orient the project toward transit, bicycle and pedestrian facilities.
 - Improve pedestrian or bicycle networks or transit service.
 - Provide traffic calming measures.
 - Limit or eliminate park supply.
 - Provide parking cash-out programs.
 - Implement or provide access to commute reduction program.
- Incorporate bicycle and pedestrian facilities into project designs, maintaining these facilities, and providing amenities incentivizing their use; and planning for and building local bicycle projects that connect with the regional network.
- Require at least five percent of all vehicle parking spaces include electric vehicle charging stations, or at a minimum, require the appropriate infrastructure to facilitate sufficient electric charging for passenger vehicles and trucks to plug-in.

In their 2022 Scoping Plan, CARB recommends that new residential projects “[use] all-electric appliances without any natural gas connections and [do] not use propane or other fossil fuels for space heating, water heating, or indoor cooking” in order to reduce Project-related GHG emissions.²¹

CEQA Guidelines 15126.4 (c)(3) include “[o]ffsite measures, including offsets that are not otherwise required, to mitigate a project’s emissions” as an option for GHG mitigation.²² An example of this was in

²¹ “2022 Scoping Plan For Achieving Carbon Neutrality” CARB, November 2022, *available at*: <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-d-local-actions.pdf>, Appendix D, p. 23, Table 3.

²² “Cal. Code Regs. tit. 14 § 15126.4.” CEQA Guidelines, May 2024, *available at*: <https://casetext.com/regulation/california-code-of-regulations/title-14-natural-resources/division-6-resources-agency/chapter-3-guidelines-for-implementation-of-the-california-environmental-quality-act/article-9-contents-of-environmental-impact-reports/section-151264-consideration-and-discussion-of-mitigation-measures-proposed-to-minimize-significant-effects>.

the case of the Oakland Sports and Mixed-Use Project, where off-site reduction measures in the neighboring communities were recommended.²³ We recommend consideration of local carbon offset programs to reduce the Project's GHG impacts as a measure of last result.

Provided above are several mitigation measures that would reduce Project-related GHG emissions. These measures offer a cost-effective, feasible way to incorporate lower-emitting design features into the proposed Project, which subsequently reduce emissions released during Project construction and operation.

An EIR should be prepared that includes all feasible mitigation measures, as well as updated GHG analyses to ensure that the necessary mitigation measures are implemented to reduce emissions to the maximum extent feasible. The IS/MND should also demonstrate a commitment to the implementation of these measures prior to Project approval, to ensure that the Project's potentially significant emissions are reduced to the maximum extent possible.

Disclaimer

SWAPE has received limited documentation regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,



Matt Hagemann, P.G., C.Hg.



Paul E. Rosenfeld, Ph.D.

²³ "Cal. Pub. Resources Code § 21168.6.7." 2023, available at: <https://casetext.com/statute/california-codes/california-public-resources-code/division-13-environmental-quality/chapter-6-limitations/section-2116867-oakland-sports-and-mixed-use-project-conditions-for-approval-certification-of-project-for-streamlining>.

Attachment A: Matt Hagemann CV
Attachment B: Paul Rosenfeld CV



2656 29th Street, Suite 201
Santa Monica, CA 90405

(949) 887-9013
mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg.

- **Geologic and Hydrogeologic Characterization, Investigation and Remediation Strategies**
- **Industrial Stormwater Compliance**
- **CEQA Review**
- **Expert Testimony**

Professional Certifications:

California Professional Geologist, P.G.
California Certified Hydrogeologist, C.Hg.

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Experience:

30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. Spent nine years with the U.S. EPA in the Resource Conservation Recovery Act (RCRA) and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where I identified emerging threats to groundwater. While with EPA, I served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. Led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, I developed extensive client relationships and has managed complex projects that include consultations as an expert witness and a regulatory specialist, and managing projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions held include:

Government:

Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);

Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
Geologist, U.S. Forest Service (1986 – 1998).

Educational:

Geology Instructor, Golden West College, 2010 – 2014, 2017;
Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
Instructor, College of Marin, Department of Science (1990 – 1995).

Private Sector:

Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);
Executive Director, Orange Coast Watch (2001 – 2004);
Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, responsibilities have included:

- Lead analyst and testifying expert, for both plaintiffs and defendants, in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards.
- Recommending additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce exposure to hazards from toxins.
- Stormwater analysis, sampling and best management practice evaluation, for both government agencies and corporate clients, at more than 150 industrial facilities.
- Serving as expert witness for both plaintiffs and defendants in cases including contamination of groundwater, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns, for both government agencies and corporate clients.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking

water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.

- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict State of California regulatory requirements.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities included:

- Leading efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiating a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identifying emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. Used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. Prepared geologic reports, conducted hearings, and responded to public comments from residents who were very concerned about the impact of designation.
- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Served as a hydrogeologist with the RCRA Hazardous Waste program. Duties included:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.

- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served as senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advising the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaping EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improving the technical training of EPA's scientific and engineering staff.
- Earning an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Establishing national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities included:

- Mapping geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinating research with community stakeholders who were concerned with natural resource protection.
- Characterizing the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large RCRA hazardous waste site in eastern Oregon.

Duties included the following:

- Supervising year-long effort for soil and groundwater sampling.
- Conducting aquifer tests.
- Investigating active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.
- Part time geology instructor at Golden West College in Huntington Beach, California from 2010 to 2014 and in 2017.

Summary of Testimony Experience Over Past Four Years

In Re New Jersey Department of Environmental Protection et al. vs. E.I. DuPont de Nemours and Company, in the United States District Court, District of New Jersey, Civil Action No. 1:19-cv-14766-RMB-JBC. Deposition in 2025.

Representing Plaintiffs in matters regarding contamination of groundwater, wastewater, soil, and air with per- and poly-fluoroalkyl substances.

In Re Edmond Asher, et al., vs. RTX Corporation (f/k/a Raytheon Technologies Corporation, et al.) in the County of Huntington Superior Court, Indiana, Cause number 35D01-2006-CT-000338. Deposition in 2024. Representing Plaintiffs in matters regarding contamination of groundwater and soil vapor with trichlorethylene.

In Re Wright vs Consolidated Rail Corporation In the Circuit Court of Cook County, Illinois, Case No: 21L3966. Deposition in 2023, Representing Plaintiff in matters involving groundwater and drinking water contamination of perchloroethylene, trichlorethylene, 1,2-dichloroethane, and carbon tetrachloride.

In Re Behr Dayton Thermal Products LLC In the United States District Court for the Southern District of Ohio Western Division at Dayton, Case No: 08-cv-326. Deposition in 2022. Representing Plaintiff in matters regarding contamination of groundwater and indoor air with perchloroethylene and trichloethelene.

Orange County Water District vs. Sabic Innovative Plastics US, LLC, et al. In the Court of Appeal, Fourth District,

Division 1, California, Case No: D070553. Deposition in 2020. Representing Plaintiff in matters involving compliance with The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Los Angeles Waterkeeper vs. AAA Plating and Inspection, Inc. In the United States District Court for the Central District of California, Case No: No. CV 18-5916 PA (GJSx). Deposition in 2019. Expert witness representing Plaintiff in matters involving contaminated stormwater runoff at an industrial facility in Compton, California.

Californians for Alternatives to Toxics vs. Schneider Dock and Intermodal Facility. In the United States District Court for the Northern District of California, Case No: 3:17-cv-05287-JST. Deposition in 2019. Expert witness representing Plaintiff in matters involving contaminated stormwater runoff at an industrial facility in Eureka, California.

Bells et al. vs. The 3M Company et al. In the United States District Court for the District of Colorado, Case No: 1:16-CV-02531-RBJ. Deposition in 2018. Expert witness representing Plaintiff on matters regarding the general hydrogeological conditions present in an area impacted by per- and poly-fluoroalkyl substances.

Ungar vs. Foundation for Affordable Housing. In the Superior Court, State of California, Los Angeles County, Case No. BC628890 Deposition in 2017. Expert witness representing defendant on matters involving alleged drinking water contamination.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S.EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Colorado.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells.

Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal representatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks.

Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukunaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.



Technical Consultation, Data Analysis and
Litigation Support for the Environment

SOIL WATER AIR PROTECTION ENTERPRISE

2656 29th Street, Suite 201
Santa Monica, California 90405
Attn: Paul Rosenfeld, Ph.D.
Mobil: (310) 795-2335
Office: (310) 452-5555
Fax: (310) 452-5550

Email: prosenfeld@swape.com

Paul Rosenfeld, Ph.D.

Principal Environmental Chemist

Chemical Fate and Transport & Air Dispersion Modeling

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Focus on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years of experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex H₂O Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Rosenfeld, P.E., Spaeth, K.R., McCarthy, S.J. *et al.* Camp Lejeune Marine Cancer Risk Assessment for Exposure to Contaminated Drinking Water From 1955 to 1987. *Water Air Soil Pollut* **235**, 124 (2024).
<https://doi.org/10.1007/s11270-023-06863-y>.

Rosenfeld P.E., Spaeth K.R., Remy L.L., Byers V., Muerth S.A., Hallman R.C., Summers-Evans J., Barker S. (2023) Perfluoroalkyl substances exposure in firefighters: Sources and implications, *Environmental Research*, Volume 220, <https://doi.org/10.1016/j.envres.2022.115164>.

Rosenfeld P.E. and Spaeth K.R., (2023) Authors' Response to Letter to the Editor from Bullock and Ramacciotti, *Water Air Soil Pollution* Volume 234, <https://doi.org/10.1007/s11270-023-06165-3>

Rosenfeld P. E., Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution*. **233**, 171.

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health*. 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. *Journal of Real Estate Research*. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.**, Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermol and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

Rosenfeld, P.E. & Feng, L. (2011). *The Risks of Hazardous Waste*. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries*. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.**, (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution*, 123 (17), 319-327.

Cheremisinoff, N.P., **Rosenfeld, P.E.** Davletshin, A.R. (2008). *Responsible Care*. Gulf Publishing. Texas.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

Rosenfeld, P.E., J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

Rosenfeld, P. E., M. Suffet. (2007). The Anatomy of Odour Wheels for Odours of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities*. Boston Massachusetts: Elsevier Publishing

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme for The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004*. New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated with Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS-6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

Rosenfeld, P.E., and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affects on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

Rosenfeld, P.E., and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

Rosenfeld, P.E., and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld**. (1998). Compost Amendment Handbook for Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

Rosenfeld, P. E. (1993). High School Biogas Project to Prevent Deforestation on St. Kitts. *Biomass Users Network*, 7(1).

Rosenfeld, P. E. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Master's thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelor's Thesis. University of California.

Presentations:

Rosenfeld, P.E., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society*. Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States” Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (20-22 July (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted at University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. *The 23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.**, Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.**, Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey’s C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey’s Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus on Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model for PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*. Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium on Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium on Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting for Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington.

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conference*. Lecture conducted from Indianapolis, Maryland.

Rosenfeld, P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation*. Lecture conducted from Anaheim California.

Rosenfeld, P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest*. Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation with High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell*. Lecture conducted from Seattle Washington.

Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest*. Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation with High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. The course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. \$41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate the effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: \$10,000 grant awarded to San Diego State University.
Goal: investigate the effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. \$100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. \$20,000 grant awarded to investigate the effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: \$10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: \$15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. \$500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the District Court of Harris County Texas
Mt Davis Interest, Inc v Sesco Cement Corp
Cause No 2023-26512
Trial 6-6-25

In the United States Southern District of New York
Gallo vs Avon Products Inc., et al
Civil Action No.: 1:23-cv-2023
Deposition 4-24-2025

In Vanderburgh Superior Court 5, County of Vanderburgh, Indiana
Markello v CSX
Civil Action No 82D05-2011-CT-004962
Deposition 3-26-25

In the Circuit Court of Cook County Illinois
Jarosiewicz v Northeast Regional Railroad
Case No 2023 L 002290
Deposition 2-27-25

In the District Court 191st Judicial District Dallas County
Acklin v Poly America International
Cause No DC-22-08610
Deposition 1-8-2025

United States District Court, Norther District of California
Asustin Vs Monsanto
Case No 2:23-cv-272
Deposition 12-20-25

In Jefferson Circuit Court Division One, Louisville, Kentucky
Stafford vs, CSX
Case No. 18-CI-001790

Deposition: 8-27-24

In the Twenty-Second Judicial Circuit of St. Louis. State of Missouri
Patricia Godfrey vs. Amtrak
Case No. 2122-CC-00525
Deposition: 7-17-24

In the Circuit Court of Jefferson County Alabama
Linda Early Vs. CSX
Case number CV-2021-00241
Deposition 6-24-24

In the Court of Common Pleas Lucas County, Ohio
Brenda Conkright vs. CSX
Case No. G-4801-CI-0202102664-000
Deposition: 6-4-24

In the Commonwealth of Kentucky, Greenup Circuit Court
Patsy Sue Napier vs. CSX
Case No. 19-CI-0012
Deposition: 5-8-2-24

In United States District Court of Hawaii
Patrick Feindt, Jr. et al. vs. The United States of America
Case No. 1:22-cv-LEK-KJM
Trial 3-29-24 and 4-5-24

In the District Court of Hood County State of Texas
Artie Gray vs. Exxon Mobil
Case No. C-2018047
Rosenfeld Deposition:4-22-2024

In the Elkhart Superior Court State of Indiana
Estate of Clark Stacy vs. Penn Central Corporation
Cause No 2D01-2001-CT-00007
Rosenfeld Deposition 1-25-2024 and 3-7-2024

In the Circuit Court of Trempealeau County, State of Wisconsin
Michael J. Sylla et al. vs. High-Crush Whitehall LLC
Case No. 2019-CV-63, 2019-CV-64, 2019-CV-65, 2019-CV-66
Rosenfeld Deposition: 3-5-2024

In the Circuit Court of Trempealeau County, State of Wisconsin
Leland Drangstveit vs. High-Crush Blair LLC
Case No. 19-CV-66
Rosenfeld Deposition 3-5-2024

In the Circuit Court of Jefferson County Alabama
Donald Lee Ashworth vs. CSX Transportation Inc.
Case No CV-2021-901261
Rosenfeld Deposition 1-23-2024

In the United States District Court for the Eastern District of Wisconsin
Gary L Siepe vs. Soo Line Railroad
Case No. 2:21-cv-00919
Rosenfeld Deposition 1-19-2024

In the United States District Court for the Western District of Louisiana
Ricky Bush v. Clean Harbors Colfax LLC
Case No. 1:22-cv-02026-DDD-JPM
Rosenfeld Deposition 12-18-2023 and 1-15-2024

In United States District Court of Hawaii
Patrick Feindt, Jr. et al. vs. The United States of America
Case No. 1:22-cv-LEK-KJM
Rosenfeld Deposition 11-29-2023

In the Circuit Court for the Twentieth Judicial Circuit St. Clair County, Illinois
Timothy Gray vs. Rural King et al.
Case No 2022-LA-355
Rosenfeld Deposition 9-26-2023

In United States District Court Eastern District of Wisconsin
Gary L. Siepe vs. Soo Line Railroad Company
Case No. 2:21-cv-00919
Rosenfeld Deposition 9-15-2023

In the Circuit Court of Cook County Illinois
Donald Fox vs. BNSF
Case No. 2021 L12
Rosenfeld Deposition 9-12-2023

In the Court of Common Pleas Cuyahoga County, Ohio
Thomas Schleich vs. Penn Central Corporation
Lead Case No. CV-20-939184
Rosenfeld Deposition 8-27-2023

In the Circuit Court of Jackson County Missouri at Kansas City
Timothy Dalsing vs. BNSF
Case No. No. 2216-cv06539
Rosenfeld Deposition 7-28-2023

In the United States District Court for the Southern District of Texas Houston Division
International Terminals Company LLC Deer Park Fire Litigation
Lead Case No. 4:19-cv-01460
Rosenfeld Deposition 7-25-2023

In the Circuit Court of Livingston County Missouri
Shirley Ralls vs. Canadian Pacific Railway and Soo Lind Railroad
Case No. 28LV-CV0020
Rosenfeld Daubert Hearing 7-18-2023 Trial Testimony 7-19-2023

In the Circuit Court of Cook County Illinois
Brenda Wright vs. Penn Central and Conrail
Case No. No. 2032L003966
Rosenfeld Deposition 6-13-2023

In the Circuit Court Common Pleas Philadelphia of Jefferson County Alabama
Frank Belle vs. Birmingham Southern Railroad Company et al.
Case No. 01-cv-2021-900901.00
Rosenfeld Deposition 4-6-2023

In the Circuit Court of Jefferson County Alabama
Linda De Gregorio vs. Penn Central
Case No. 002278
Rosenfeld Deposition 3-27-20203

In the United States District Court Eastern District of New York
Rosalie Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-16-2023

In the Superior Court of Washington, Spokane County
Judy Cundy vs. BNSF
Case No. 21-2-03718-32
Rosenfeld Deposition 3-9-2023

In The Court of Common Pleas of Philadelphia County, PA Civil Trial Division
Feaster v Conrail
Case No. 001075
Rosenfeld Deposition 2-1-2023

In United States District Court for the Central District of Illinois
Sherman vs. BNSF
Case No. 3:17-cv-01192
Rosenfeld Deposition 1-18-2023

In United States District Court District of Colorado
Gonzales vs. BNSF
Case No. 1:21-cv-01690
Rosenfeld Deposition 1-17-2023

In United States District Court District of Colorado
Abeyta vs. BNSF
Case No. 1:21-cv-01689-KMT
Rosenfeld Deposition 1-3-2023

In United States District Court For The Easter District of Louisiana
Nathaniel Smith vs. Illinois Central Railroad
Case No. 2:21-cv-01235
Rosenfeld Deposition 11-30-2022

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division

Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022

In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022, Trial 1-10-2023

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation

Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021

In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al. vs Cerro Flow Products, Inc.
Case No. 0i9-L-2295
Rosenfeld Deposition 5-14-2021
Trial October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a
AMTRAK,
Case No. 18-L-6845
Rosenfeld Deposition 6-28-2021

In the United States District Court For the Northern District of Illinois

Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

In the Superior Court of the State of Arizona In and For the County of Maricopa
Mary Tryon et al. vs. The City of Phoenix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. CV20127-094749
Rosenfeld Deposition 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al vs. CNA Insurance Company et al.
Case No. 1:17-cv-000508
Rosenfeld Deposition 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.
Case No. 1716-CV10006
Rosenfeld Deposition 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.
Case No. 2:17-cv-01624-ES-SCM
Rosenfeld Deposition 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS “Conti Perdido” Defendant.
Case No. 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No. BC615636
Rosenfeld Deposition 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs vs. The 3M Company et al., Defendants
Case No. 1:16-cv-02531-RBJ
Rosenfeld Deposition 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosiences, LLC, et al., Defendants

Cause No. 1923
Rosenfeld Deposition 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No. C12-01481
Rosenfeld Deposition 11-20-2017

In The Circuit Court of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case No. 1:19-cv-00315-RHW
Rosenfeld Deposition 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No. LC102019 (c/w BC582154)
Rosenfeld Deposition 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants
Case No. 4:16-cv-52-DMB-JVM
Rosenfeld Deposition July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No. RG14711115
Rosenfeld Deposition September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No. LALA002187
Rosenfeld Deposition August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. vs. Antero, et al.
Civil Action No. 14-C-30000
Rosenfeld Deposition June 2015

In The Iowa District Court for Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No. 4980
Rosenfeld Deposition May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.

Case No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, vs. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City
Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant*.
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the County of Kern, Unlimited Jurisdiction
Rose Propagation Services vs. Heppe Enterprises
Case No. S-1500-CV-278190, LHB
Rosenfeld Deposition: May 2014

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

In the Court of Galveston County, Texas 56th Judicial District
MDL Litigation Regarding Texas City Refinery Ultracracker Emission Event Litigation
Cause No. 10-UC-0001
Rosenfeld Deposition: March 2013
Rosenfeld Trial: September 2013

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and
on behalf of those similarly situated, *Plaintiffs*, vs. BP Products North America, Inc., *Defendant*.
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the United States District court of Southern District of California
United States of America, Plaintiff vs. 2,560 Acres of Land, more or less, located in Imperial County, State
of California; and Donald L. Crawford, et. al.
Civil No. 3:11-cv-02258-IEG-RBB
Rosenfeld Deposition: December 2012, January 2013

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs*, vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., Plaintiffs, vs. International Paper Company, Defendant.

Civil Action No. 2:09-cv-232-WHA-TFM
Rosenfeld Deposition July 2010, June 2011

EXHIBIT B

Shawn Smallwood, PhD
3108 Finch Street
Davis, CA 95616

Attn: Carlos Flores, Deputy Director of Development Services
City of Palm Desert Planning Division
73510 Fred Waring Drive
Palm Desert, CA 92260

2 December 2025

RE: Catavina Residential Project IS/MND

Dear Mr. Flores,

I write to comment on potential impacts to biological resources that would result from development of the proposed Catavina Residential Project. I understand the project would add 546 houses on 77.8 acres south of Frank Sinatra Dr and west of Portola Ave in Palm Desert, California. My comments that follow address my concerns that the Initial Study/Mitigated Negative Declaration (IS/MND), supported by Michael Baker International (MBI 2025), mischaracterizes the existing environmental setting, and that its impacts analysis is flawed and its mitigation measures are inadequate.

My qualifications for preparing expert comments are the following. I hold a Ph.D. degree in Ecology from University of California at Davis, where I also worked as a post-graduate researcher in the Department of Agronomy and Range Sciences. My research has been on animal density and distribution, habitat selection, wildlife interactions with the anthroposphere, and conservation of rare and endangered species. I authored many papers on these and other topics. I served as Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section. I am a member of The Wildlife Society and Raptor Research Foundation, and I've lectured part-time at California State University, Sacramento. I was Associate Editor of wildlife biology's premier scientific journal, The Journal of Wildlife Management, as well as of Biological Conservation, and I was on the Editorial Board of Environmental Management. I have performed wildlife surveys in California for thirty-seven years. My CV is attached.

THE WILDLIFE COMMUNITY AS A BIOLOGICAL RESOURCE

Most environmental reviews pursuant to the California Environmental Quality Act (CEQA) focus on special-status species because CEQA's Checklist Evaluation of Environmental Impacts specifies that such evaluation includes potential impacts to special-status species. However, an important policy of CEQA is "to prevent the elimination of fish or wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history." Pub. Res. Code § 21001(c). This policy is not restricted to special-status species, but it also applies to wildlife populations and plant and animal communities. In fact, the CEQA Guidelines Section 21155.1 defines wildlife habitat as "the ecological communities upon which wild animals, birds, plants, fish,

amphibians, and invertebrates depend for their conservation and protection.” This definition is consistent with the scientific definition of habitat, which is that portion of the environment that is used by members of a species for survival and reproduction (Hall et al. 1997). An essential portion of the environment used by any special-status species is composed of the collection of other species of plants and wildlife, because these species are forage, provisioners of refugia and nest substrates, and ecological mutualists; no special-status species can exist in a vacuum of other wildlife. The CEQA Checklist Evaluation assigns priority to special-status species to balance information and cost, but it does not exclude the need to evaluate environmental impacts to other species, which, after all, are members of the very communities within which special-status species inter-depend for survival and reproduction.

All wildlife species should be of concern in a CEQA review, but the CEQA prioritizes special-status species. The species I consider to be special-status species are those listed in California’s Special Animals List inclusive of threatened and endangered species under the California and federal Endangered Species Acts, candidates for listing under CESA and FESA, California’s Fully Protected Species, California species of special concern, and California’s Taxa to Watch List (<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406>), continental and region-specific US Fish and Wildlife Service Birds of Conservation Concern (<https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf>), and naturally rare species such as raptors protected by California’s Birds of Prey laws, Fish and Game Code Sections 3503, 3503.5, 3505 and 3513 (see <https://wildlife.ca.gov/Conservation/Birds/Raptors>).

What follows is a summary of a site visit to detect as many of the species of wildlife as possible within the short time available. The survey was also intended to detect as many of the special-status species as possible, but with the understanding that most special-status species are less readily detectable due to rarity and crypticity. Nonetheless, the species detected can indicate the ecological integrity of the site and thus the likelihood of occurrence of special-status species not yet detected.

SITE VISIT

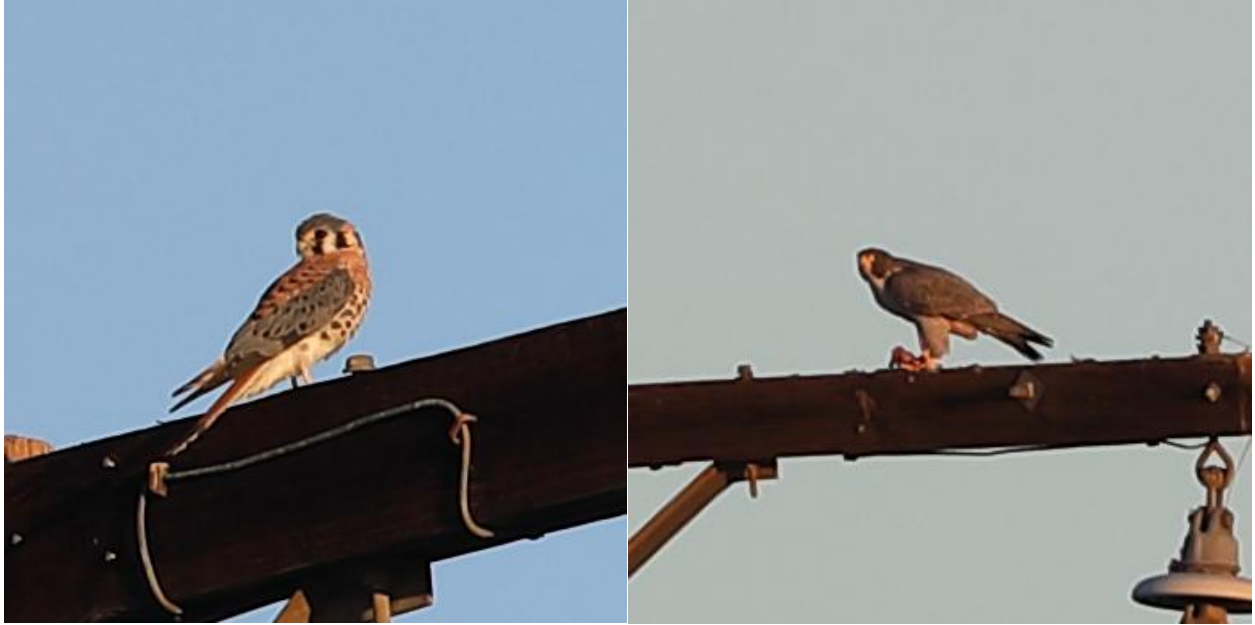
On my behalf, Noriko Smallwood, a wildlife biologist with a Master of Science Degree from California State University Los Angeles, visited the site of the proposed project for 1.68 hours of diurnal survey from 15:13 to 16:53 hours and 2.03 hours of nocturnal survey from 17:04 to 19:06 hours on 5 November 2025, and for 2.5 hours of diurnal survey from 06:02 to 08:32 hours on 6 November 2025. During daylight, Noriko walked the site’s perimeter where accessible, stopping to scan for wildlife with use of binoculars. At night, Noriko strapped a Pettersson M500 acoustic bat detector to a 10-foot pole, and cabled the detector to her computer, which ran Sonobat Live. Sonobat Live identifies bats to species based on the bats’ sonograms that are detected by the M500. Noriko recorded all species of vertebrate wildlife she detected, including those whose members flew over the site or were seen just off the site. Animals of uncertain species identity were either recorded to the Genus or higher taxonomic level.

On 5 November 2025, conditions were partly cloudy with 5 MPH north wind and temperatures of 83-73° F during the diurnal survey, and clear with 5 MPH north wind and temperatures of 73-68° F during the nocturnal survey. On 6 November 2025, conditions were sunny with 5 MPH west wind and temperatures of 60-72° F. The site is primarily disturbed desert scrub that's treated with herbicide. The site contains scattered trees and shrubs including mesquite and coyote brush (Photos 1 and 2).

Noriko saw American kestrel and peregrine falcon (Photos 3 and 4), double-crested cormorant and great egret (Photos 5 and 6), verdin and Costa's hummingbird (Photos 7 and 8), common raven (Photo 9), black phoebe and Say's phoebe (Photos 10 and 11), mourning dove (Photo 12), white-crowned sparrow and yellow-rumped warbler (Photos 13 and 14), among the other species listed in Table 1. Noriko detected 33 species of vertebrate wildlife at or adjacent to the project site, including 10 species with special status (Table 1).



Photos 1 and 2. Views of the project site, 6 November 2025. Photos by Noriko Smallwood.



Photos 3 and 4. American kestrel (left), and peregrine falcon (right) on the project site, 6 November 2025. Photos by Noriko Smallwood.



Photos 5 and 6. Double-crested cormorant (left), and great egret (right) on the project site, 6 November 2025. Photos by Noriko Smallwood.



Photos 7 and 8. Verdin on the project site (left), and Costa's hummingbird just off the project site (right), 6 November 2025. Photos by Noriko Smallwood.



Photo 9. Common raven on the project site, 6 November 2025. Photo by Noriko Smallwood.



Photos 10 and 11. Black phoebe (left), and Say's phoebe (right) on the project site, 6 November 2025. Photos by Noriko Smallwood.



Photo 12. Mourning doves just off the project site, 6 November 2025. Photo by Noriko Smallwood.



Photos 13 and 14. White-crowned sparrow on the project site (left), and yellow-rumped warbler just off the project site (right), 6 November 2025. Photos by Noriko Smallwood.

Noriko twice detected a bat on the project site, but Sonobat Live lacked sufficient portions of the calls to definitively identify the species. The species was either a spotted bat or a hoary bat. If a spotted bat, then Noriko detected a California Species of Special Concern, and if a hoary bat, then Noriko detected a bat that is considered of moderate conservation concern by the Western Bat Working Group.

Noriko Smallwood certifies that the foregoing and following survey results are true and accurately reported.

Noriko Smallwood
Noriko Smallwood

Table 1. Species of wildlife Noriko observed during 1.68 hours of diurnal survey and 2.03 hours of nocturnal survey on 5 November 2025, and during 2.5 hours of diurnal survey on 6 November 2025.

Common name	Species name	Status ¹	Notes
Canada goose	<i>Branta canadensis</i>		Just off site
Mallard	<i>Anas platyrhynchos</i>		Flock just off site
Rock pigeon	<i>Columba livia</i>	Non-native	
Eurasian collared-dove	<i>Streptopelia decaocto</i>	Non-native	
Mourning dove	<i>Zenaida macroura</i>		
Greater roadrunner	<i>Geococcyx californianus</i>		Tracks on site
Costa's hummingbird	<i>Calypte costae</i>	BCC	Foraged, socialized
California gull	<i>Larus californicus</i>	BCC, WL	Flew over
Double-crested cormorant	<i>Nannopterum auritum</i>	WL	Flew over

Great egret	<i>Ardea alba</i>		Flew over
Turkey vulture	<i>Cathartes aura</i>	BOP	Flew over
Cooper's hawk	<i>Accipiter cooperii</i>	WL, BOP	Flew over just off site
Short-eared owl	<i>Asia flammeus</i>	BCC, SSC3, BOP	Flew low over site in evening
American kestrel	<i>Falco sparverius</i>	BOP	With prey item
Peregrine falcon	<i>Falco peregrinus</i>	BOP	With prey item
Black phoebe	<i>Sayornis nigricans</i>		
Say's phoebe	<i>Sayornis saya</i>		Foraged
American crow	<i>Corvus brachyrhynchos</i>		Flew over
Common raven	<i>Corvus corax</i>		Foraged
Verdin	<i>Auriparus flaviceps</i>	BCC	Foraged
Ruby-crowned kinglet	<i>Regulus calendula</i>		Just off site
House sparrow	<i>Passer domesticus</i>	Non-native	Just off site
American pipit	<i>Anthus rubescens</i>		Flew over, called
House finch	<i>Haemorphous mexicanus</i>		
Lesser goldfinch	<i>Spinus psaltria</i>		Flew over, called
White-crowned sparrow	<i>Zonotrichia leucophrys</i>		
Brewer's blackbird	<i>Euphagus cyanocephalus</i>		Flocks flew over
Great-tailed grackle	<i>Quiscalus mexicanus</i>		Flew over
Orange-crowned warbler	<i>Oreothlypis celata</i>		Just off site
Yellow-rumped warbler	<i>Setophaga coronata</i>		Foraged
Spotted bat or hoary bat	<i>Euderma maculatum</i> or <i>Lasiurus cinereus</i>	SSC, WBWG:H or WBWG:M	
Desert cottontail	<i>Sylvilagus audubonii</i>		Scat
Kangaroo rat	<i>Dipodomys sp.</i>		Many burrows

¹ Listed on CDFW's Special Animals List (<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406>) as BCC = U.S. Fish and Wildlife Service's Bird of Conservation Concern (<https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf>); SSC_i = California Species of Special Concern with *i* = priorities 1, 2 and 3; WL = CDFW's Taxa to Watch List; WBWG = Western Bat Working Group with priority rankings, of low (L), moderate (M), and high (H); BOP = protected by Birds of Prey (California Fish and Game Code 3503.5, see <https://wildlife.ca.gov/Conservation/Birds/Raptors>).

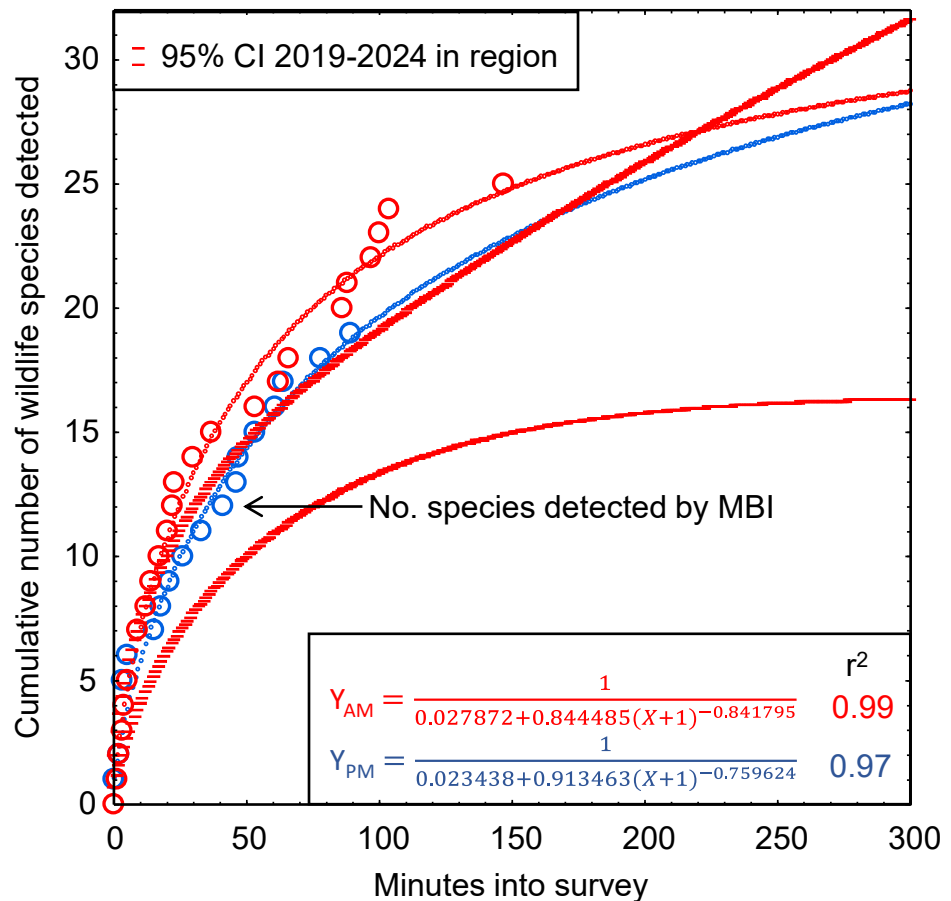
ANALYSIS OF RECONNAISSANCE SURVEY DATA

Noriko detected 33 species of vertebrate wildlife, which was a large number for the brevity of her survey effort. All the species in Table 1 would lose habitat as the result of the project and its replacement of natural ground covers with impervious surfaces. Smallwood and Smallwood (2023) confirmed this habitat loss by measuring the impacts of similar developments on species richness and the abundances of wildlife. Smallwood and Smallwood (2023) directly compared the species and the numbers of animals observed prior to development to the those observed after development, while they did the same at control sites. The measured losses of these species resulting from development is indicative of habitat loss, because habitat is defined as that portion of the environment that is used for survival and reproduction by members of a species

(Hall et al. 1997), and this use is inferred by observations of the presence of a species (Smallwood 2002).

However, the species of wildlife Noriko detected at the project site were not the only species that were present during her surveys, as there are always species that are not detected. To demonstrate this, I fit nonlinear regression models to Noriko's cumulative numbers of vertebrate species detected with time into her daytime surveys to predict the number of species that she would have detected with longer surveys or perhaps with additional biologists available to assist her. The type of model is a logistic growth model, which reaches an asymptote that corresponds with the theoretical maximum number of vertebrate wildlife species that could have been detected during the survey. The model fit to Noriko's survey data from the evening of 5 November predicts 43 species of vertebrate wildlife were available to be detected, or 24 more species than she detected that evening (Figure 1). The model fit to Noriko's survey data from the morning of 6 November predicts 36 species of vertebrate wildlife were available to be detected, or 11 more species than she detected that morning (Figure 1). The rate of species detections in the morning survey followed along the upper bound of the 95% confidence interval estimated from many other morning surveys we completed in the region. And the patterns in her species detection rates were similar between her morning and evening surveys.

Figure 1. Actual and predicted relationships between the numbers of vertebrate wildlife species detected and the elapsed survey time based on Noriko's visual-scan surveys on 5 and 6 November 2025. Note the confidence interval applies only to the morning survey (red line).



Unknown are the identities of the species Noriko missed, but the species that Noriko did and did not detect on 5 and 6 November 2025 composed only a fraction of the species that would occur at the project site over the period of a year or longer. This is because many species are seasonal in their occurrence, some require more survey effort because they are highly cryptic, and the members of other species would visit the site only periodically while patrolling large home ranges. Surveys on only two days cannot possibly detect all of the species of the local wildlife community.

At least a year's worth of surveys would be needed to more accurately report the number of vertebrate species that occur at the project site, but I only have Noriko's two surveys. However, by use of an analytical bridge, a modeling effort applied to a large, robust data set from a research site can predict the number of vertebrate wildlife species that likely make use of the site over the longer term. This analytical bridge draws inference from the pattern of species detections more than it does from the research site, and I note that the pattern, i.e., rate, of species detections is consistent from site to site.

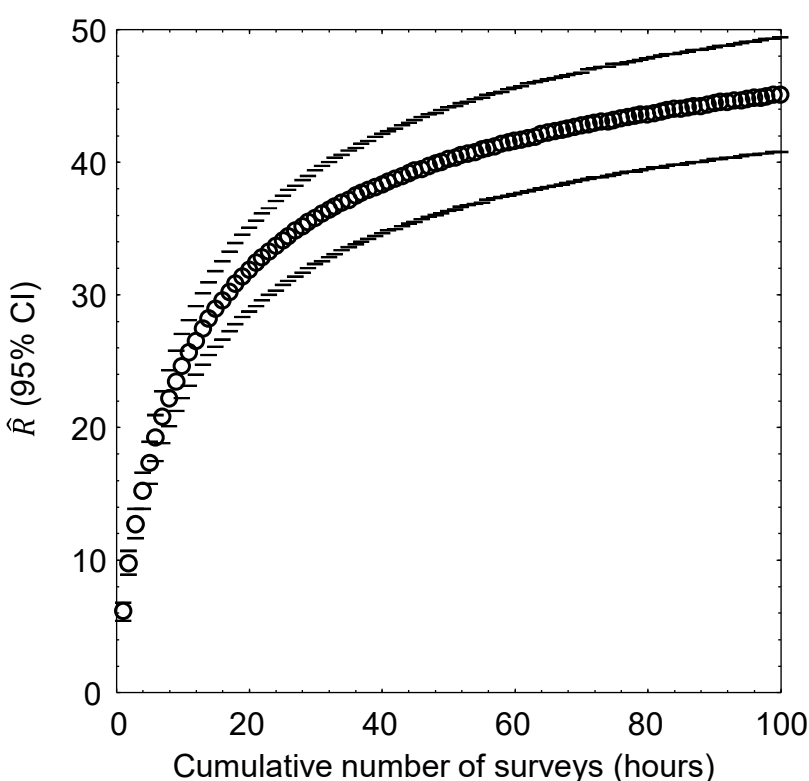
As part of my research, I completed a much larger survey effort across 167 km² of annual grasslands of the Altamont Pass Wind Resource Area, where from 2015 through 2019 I performed 721 1-hour visual-scan surveys, or 721 hours of surveys, at 46 stations. I used binoculars and otherwise the methods were the same as the methods I and other consulting biologists use for surveys at proposed project sites. At each of the 46 survey stations, I tallied new species detected with each sequential survey at that station, and then related the cumulative species detected to the hours (number of surveys, as each survey lasted 1 hour) used to accumulate my counts of species detected. I used combined quadratic and simplex methods of estimation in Statistica to estimate least-squares, best-fit nonlinear models of the number of cumulative species detected regressed on hours of survey (number of surveys) at the station: $\hat{R} = \frac{1}{1/a + b \times (Hours)^c}$, where $\hat{R}$ represented cumulative species richness detected. The coefficients of determination, r^2 , of the models ranged 0.88 to 1.00, with a mean of 0.97 (95% CI: 0.96, 0.98); or in other words, the models were excellent fits to the data.

I projected the predictions of each model to thousands of hours to find predicted asymptotes of wildlife species richness. The mean model-predicted asymptote of species richness was 57 after 11,857 hours of visual-scan surveys among the 46 stations of my research site. I also averaged model predictions of species richness at each incremental increase of number of surveys, i.e., number of hours (Figure 2). On average I would have detected 15.6 species over my first 4.18 hours of diurnal surveys at my research site in the Altamont Pass (4.18 hours to match the 4.18 hours Noriko surveyed during daylight hours at the project site), which composed 27.4% of the predicted total number of species I would detect with a much larger survey effort at the research site. Given the example illustrated in Figure 2, the 31 diurnally active species Noriko detected after her 4.18 hours of daylight survey at the project site likely represented 27.4% of the species to be detected after many more visual-scan surveys over another year or longer. With many more repeat surveys through the year, Noriko would likely detect $31/0.274 = 113$ species of diurnally active vertebrate wildlife at the site. Assuming Noriko's ratio of special-status to non-special-status species was to hold through the detections of all 113

predicted species, then continued surveys would eventually detect 29 special-status species of diurnally active vertebrate wildlife.

Because my prediction of 113 species of vertebrate wildlife, including 29 special-status species, is derived from daytime visual-scan surveys, and would detect few nocturnal mammals such as bats, the true number of species composing the wildlife community of the site must be larger. Noriko's reconnaissance surveys should serve only as a starting point toward characterization of the site's wildlife community, but it certainly cannot alone inform of the inventory of species that use the site. More surveys are needed than her two surveys to produce an inventory the project site's wildlife community. Nevertheless, the large number of species I predict at the project site is indicative of a relatively species-rich wildlife community that warrants a serious survey effort.

Figure 2. Mean (95% CI) predicted wildlife species richness, $\hat{R}$, as a nonlinear function of hour-long survey increments across 46 visual-scan survey stations across the Altamont Pass Wind Resource Area, Alameda and Contra Costa Counties, 2015–2019. Note that the location of the study is largely irrelevant to the utility of the graph to the interpretation of survey outcomes at the project site. It is the pattern in the data that is relevant, because the pattern is typical of the pattern seen elsewhere.



EXISTING ENVIRONMENTAL SETTING

The first step in analysis of potential project impacts to biological resources is to accurately characterize the existing environmental setting, including the wildlife community and any key ecological relationships and known and ongoing threats to special-status species. A reasonably accurate characterization of the environmental setting can provide the baseline against which to analyze potential project impacts. For these reasons, characterization of the environmental setting, including the project site's regional setting, is one of the CEQA's essential analytical steps. Methods to achieve this first step typically include (1) surveys of the site for biological resources, and (2) reviews of literature, databases and local experts for documented occurrences of special-status

species. In the case of the proposed project, these steps were taken, though not with sufficient rigor and not interpreted in furtherance of an accurate characterization of the wildlife community.

Environmental Setting informed by Field Surveys

To the CEQA's primary objective to disclose potential environmental impacts of a proposed project, the analysis should be informed of which biological species are known to occur at the proposed project site, which special-status species are likely to occur, as well as the limitations of the survey effort directed to the site. Analysts need this information to characterize the environmental setting as a basis for opining on, or predicting, potential project impacts to biological resources. In the case of this project, however, more surveys were needed.

MBI (2025:3) conducted a reconnaissance survey on 16 January 2025 to “conduct a habitat assessment for special-status plant and wildlife species and sensitive natural communities; and determine the presence of aquatic resources.” MBI committed 12 person-hours to this survey. MBI (2025) reports to have detected 11 species of vertebrate wildlife, but it detected 12 species after counting the black phoebe that appears in the report's compendium of observed species. However, MBI (2025) fails to explain whether the detections of 11 or 12 species are typical of a reconnaissance survey. There is no comparison to the survey findings elsewhere, and there is no assessment of the survey findings relative to the survey effort.

MBI (2025) characterizes its survey findings as a “wildlife inventory.” Its findings were nowhere close to representing an inventory of the species composing the wildlife community. A survey on one day cannot inventory the wildlife community.

MBI's survey findings are misrepresented. According to MBI (2025:6) and repeated in the IS/MND (p.4-20), “No special-status wildlife species were observed during the field survey.” However, this statement is inconsistent with MBI's detections of Costa's hummingbird and verdin, both of which are US Fish and Wildlife Service Birds of Conservation Concern. Additionally, there is no assessment of the detection likelihoods of special-status species based on four hours of survey (12 person-hours). Based on my experience, it would have been highly unlikely to detect most special-status species of wildlife in a 4-hour survey that started at noon. A survey from 12:00 to 16:00 hours overlaps with the nadir of daily wildlife activity (Figure 3). And it takes many hours of reconnaissance surveys to detect nearly all the special-status species of diurnally active vertebrate wildlife on a site (Figure 4). Analytically bridging MBI's survey outcome with my research from a site in Rancho Cordova indicates that MBI would have eventually detected 21 special-status species of diurnally active vertebrate wildlife, or an order of magnitude more special-status species than they number MBI found.

MBI (2025) could have found even more special-status species had it performed surveys for bats, or had it deployed coverboards for reptiles, or had it live-trapped for small mammals. It is not enough to report only what was found; it is also important to disclose what was not found due to insufficient survey effort.

Figure 3. Tallies of vertebrate wildlife species detected in 2-hour reconnaissance surveys at different times of day, where tallies are represented as proportions of the maximum count of species over all five surveys per research site.

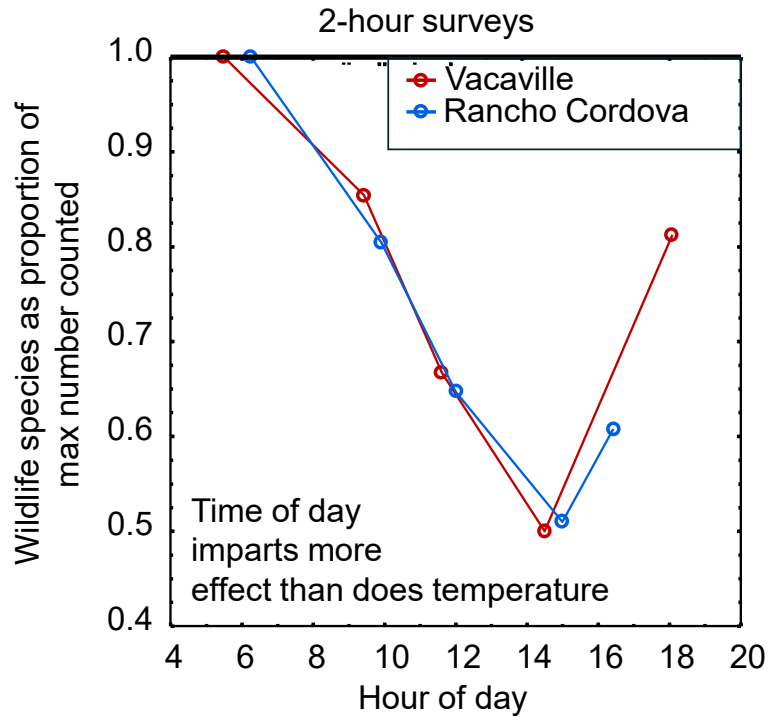
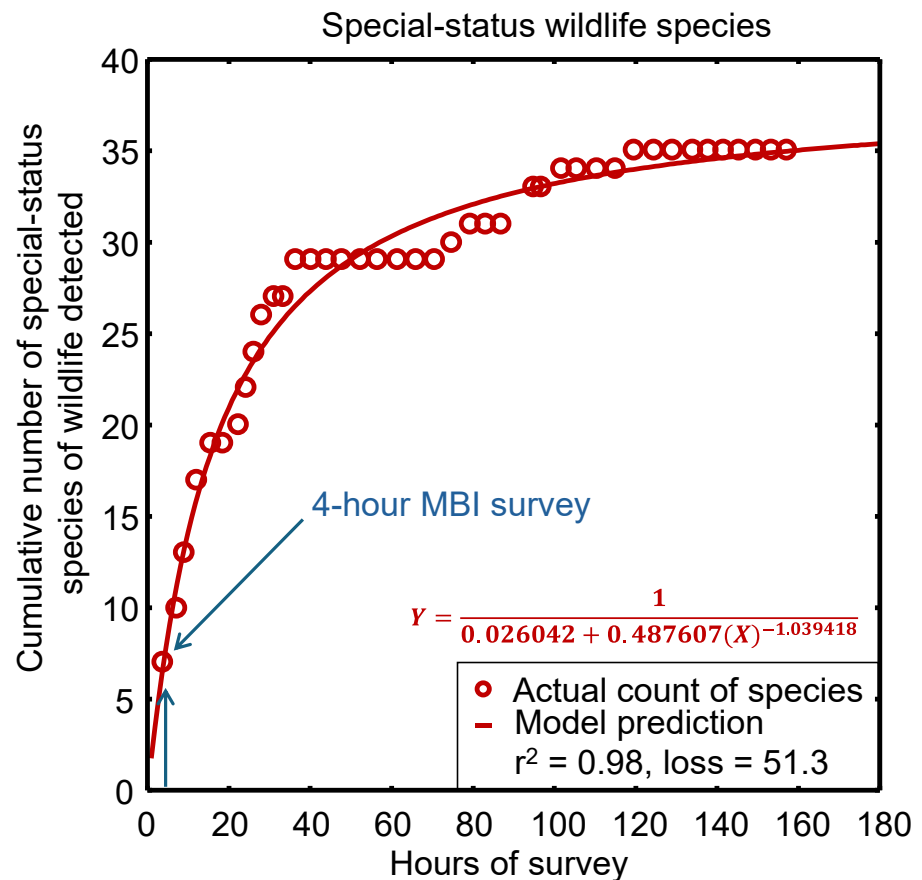


Figure 4. Accumulation of detections of special-status species of vertebrate wildlife with increasing hours of reconnaissance survey at a Rancho Cordova site, 2020-2023. The model fit to my data predicts 36 special-status species of wildlife, of which my first 4 hours of survey detected 7 (19%). MBI (2025) surveyed for 4 hours, indicating it would have detected 21 special-status species after many more surveys.



Compared to MBI's findings, Noriko detected nearly three times the number of vertebrate wildlife species in only one-third the person-hours. MBI (2025) detected two species that Noriko did not, and Noriko detected 23 species that MBI did not. Noriko detected five times the number of special-status species as did MBI. Much of the differences in Noriko's and MBI's survey outcomes can probably be attributed to Noriko's survey start times in the early morning and evening, as well as her performance of a nocturnal survey for bats. Experienced biologists should know that more wildlife is to be detected at these times.

Altogether, Noriko and MBI detected 35 species of vertebrate wildlife.

Lack of Detection Surveys

Burrowing owl: There are three types of surveys recommended and described in the CDFW's (2012) survey and mitigation guidelines: (1) Habitat assessment, (2) Detection surveys, and (3) Preconstruction survey. The habitat assessment is intended to evaluate the likelihood that the site supports burrowing owls, and to decide whether detection surveys should be performed. The detection survey, otherwise described as either or both breeding-season or non-breeding-season survey, is intended to detect whether the site truly supports burrowing owls, and if so, where and how many. The preconstruction survey, otherwise known as a take-avoidance survey, is intended to determine whether burrowing owls immigrated to the site since completion of the detection survey, or whether they returned to the site since passive or active relocations were performed as mitigation. The three types of survey carry distinct but inter-related purposes, and CDFW (2012) intends them to be completed in chronological order as numbered above.

The first two types of survey support impacts analysis, whereas the third type of survey is a mitigation measure. Burrowing owls can be determined absent based on evidence derived from the habitat assessment or detection survey, but only if the surveys achieved the minimum standards of CDFW (2012). Whereas an absence determination naturally follows from the negative findings of properly performed detection surveys, the following three questions must be answered negatively to determine absence based on the habitat assessment:

- A) Are there occurrence records nearby the project site?
- B) Is the site's vegetation cover and height typical of where burrowing owls are found?
- C) Are there fossorial mammals present which typically construct burrows useable by burrowing owls, or are there surrogate cavities that can serve as nest sites?

If the answers to these questions are compellingly negative, then detection surveys are not necessary, but they could be implemented to make certain that burrowing owls are absent on the project site. If the answers to these questions are affirmative or not compellingly negative, then it should be assumed that burrowing owl habitat exists on the site until detection surveys prove otherwise.

To question A, the nearest burrowing owl occurrence record is within 3 miles of the project site. Moreover, MBI (2025) determines that the occurrence likelihood of burrowing owls is moderate.

To question B, the vegetation cover on site is typical of vegetation cover often used by burrowing owls. The answer to question B is affirmative, and so this part of the habitat assessment warrants a detection survey effort.

To question C, ground squirrels are not known to presently occur on the project site, but there are many kangaroo rat burrows and there are desert cottontails, which also construct or enlarge existing burrows. The answer to question C is affirmative, and so this part of the habitat assessment warrants a detection survey effort.

The answers to all three questions are affirmative. Therefore, breeding-season detection surveys are needed, and these surveys are not to be confused with preconstruction take-avoidance surveys. Breeding-season detection surveys are needed to publicly disclose potential impacts on the burrowing owl. Moreover, the applicant needs to consult with the CDFW for the purpose of obtaining an incidental take permit.

Rare Plants: Lastly, MBI (2025) does not meet the minimum standards of the CDFW (2018) survey guidelines for rare plants. Having surveyed in mid-January, MBI did not survey at the right time of year, it surveyed only once, and it visited no reference populations of rare plants that could occur on the project site. According to the IS/MND (p. 4-20), “Based on the results of the literature review and the field survey, existing/historical site conditions, and a review of specific habitat requirements, occurrence records, and known distributions, Michael Baker determined that all special-status plant species identified during the literature review are not expected to occur due to a lack of suitable habitat.” However, the field survey was ill-timed to support this conclusion, occurrence records cannot be used to conclude the absence of a species. The only other basis for the conclusion is MBI’s judgement, but its judgement applied to its survey result and to its use of occurrence records discredits any other judgement it might have applied to its determinations of occurrence likelihoods of rare plants. What is needed is for the City to retain qualified botanists to survey the project site for rare plants at the appropriate time of year and consistent with the standards of CDFW (2018).

Environmental Setting informed by Desktop Review

The purpose of literature and database reviews and of consulting with local experts is to inform the field survey, and to augment interpretation of its outcome. Analysts need this information to identify which species are known to have occurred at or near the project site, and to identify which other special-status species could conceivably occur at the site due to geographic range overlap and migration flight paths. In the case of this project, the desktop review was incomplete, and the review that was completed was distorted to minimize the likelihoods of occurrence of special-status species.

In its reporting of how it established the pool of special-status species for assessment of occurrence likelihoods, MBI (2025:2) states that “Prior to conducting a field survey, Michael Baker conducted a thorough literature review and records search to characterize existing site conditions and assess the potential for special-status biological resources to occur that might pose a constraint to Project implementation.” However, as part of this literature review and records search, MBI (2025) makes little use of iNaturalist or eBird, having used these databases for only three species. The step of establishing the pool of species to be analyzed for occurrence likelihoods was incomplete.

To establish the pool of special-status species for assessment of occurrence likelihoods, MBI (2025) queried CNDDDB for occurrence records within USGS Quadrangles immediately surrounding and inclusive of the project site. By querying the CNDDDB to establish the pool of special-status species for analysis of occurrence likelihoods, MBI (2025) screened out many special-status species from further consideration in the characterization of the wildlife community as part of the existing environmental setting. The CNDDDB is not designed to support absence determinations or to screen out species from characterization of a site’s wildlife community. As noted by the CNDDDB, *“The CNDDDB is a positive sighting database. It does not predict where something may be found. We map occurrences only where we have documentation that the species was found at the site. There are many areas of the state where no surveys have been conducted and therefore there is nothing on the map. That does not mean that there are no special status species present.”* MBI (2025) and hence the IS/MND misuse the CNDDDB.

The CNDDDB relies entirely on volunteer reporting from biologists who were allowed access to whatever properties they report from. Many properties have never been surveyed by biologists. Many properties have been surveyed, but the survey outcomes never reported to the CNDDDB. Many properties have been surveyed multiple times, but not all survey outcomes reported to the CNDDDB. Furthermore, the CNDDDB is interested only in the findings of special-status species, which means that species more recently assigned special status will have been reported many fewer times to the CNDDDB than were species assigned special status since the inception of the CNDDDB. Therefore, occurrence records in the CNDDDB are most abundant for species assigned special status decades ago, but fewest for species only recently assigned special status. And because negative findings are not reported to the CNDDDB, the CNDDDB is also inappropriate as a basis for weighting occurrence likelihoods such as absent, not expected, unlikely, low, moderate or high. Whereas the CNDDDB can be confirmatory of species presence, it cannot support absence determinations or assignments of low likelihood of occurrence. And again, the screening out of a species due to lack of occurrence records in the CNDDDB is the same as an absence determination, and this step is being taken without adequate support of field surveys.

In my assessment based on a database review and site visits, 146 special-status species of wildlife are known to occur near enough to the site to warrant analysis of occurrence potential (Table 2). Not all these species should be expected to occur at the project site, but each of them should be given a closer look to determine occurrence likelihoods and

whether additional surveys are needed, or implementation of detection surveys, or whether it would be reasonable to assume presence. Of these 146 species, 10 were recorded on or just off the project site, and another 37 (25%) species have been documented within 1.5 miles of the site (Very close), another 19 (13%) between 1.5 and 4 miles (Nearby), and another 74 (51%) between 4 to 30 miles (In region). Almost half (45%) the species in Table 2 have been reportedly seen within 4 miles of the project site. The site therefore supports at least 10 special-status species of wildlife, and it carries the potential for supporting many more special-status species of wildlife based on the proximities of recorded occurrences. Evidence certainly suggests that habitat assessments are needed for these species.

Table 2. Occurrence likelihoods of special-status bird species at or near the proposed project site, according to eBird/iNaturalist records (<https://eBird.org>, <https://www.inaturalist.org>) and on-site survey findings, where ‘Very close’ indicates within 1.5 miles of the site, “nearby” indicates within 1.5 and 4 miles, and “in region” indicates within 4 and 30 miles, and ‘in range’ means the species’ geographic range overlaps the site. Entries in bold font identify species detected by Noriko Smallwood and I during our site visits. CVMSHSP refers to species covered by the Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP).

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Casey’s June beetle	<i>Dinacoma caseyi</i>	FE		Not expected	In region
Monarch	<i>Danaus plexippus</i>	FC		Not expected	Very close
Crotch’s bumble bee	<i>Bombus crotchii</i>	CCE		Not expected	Nearby
Coachella giant sand treader cricket	<i>Macrobaenetes valgum</i>		Yes	Not expected	Nearby
Couch’s spadefoot	<i>Scaphiopus couchii</i>	SSC			In range
Southwestern pond turtle	<i>Actinemys pallida</i>	FC, SSC			In region
Mojave desert tortoise	<i>Gopherus agassizii</i>	FT, CE	Yes	Not expected	In region
Coast horned lizard	<i>Phrynosoma blainvillii</i>	SSC		Moderate	In region
Flat-tailed horned lizard	<i>Phrynosoma mcallii</i>	SSC	Yes	Not expected	In region
Coachella Valley fringe-toed lizard	<i>Uma inornata</i>	FT, CE	Yes	Not expected	In region
Red-diamond rattlesnake	<i>Crotalus ruber</i>	SSC		Moderate	Very close
Desert pupfish	<i>Cyprinodon macularius</i>	FE, CE		Not expected	In region
Fulvous whistling-duck	<i>Dendrocygna bicolor</i>	SSC1			In region
Brant	<i>Branta bernicla</i>	SSC2			In region
Cackling goose (Aleutian)	<i>Branta hutchinsii leucopareia</i>	WL			Very close
Redhead	<i>Aythya americana</i>	SSC2			Very close
Western grebe	<i>Aechmophorus occidentalis</i>	BCC			Very close
Clark’s grebe	<i>Aechmophorus clarkii</i>	BCC			Very close
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	FT, CE			In region
Black swift	<i>Cypseloides niger</i>	SSC3, BCC			In region
Vaux’s swift	<i>Chaetura vauxi</i>	SSC2			Very close
Costa’s hummingbird	<i>Calypte costae</i>	BCC			Very close/ On site

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Calliope hummingbird	<i>Selasphorus calliope</i>	BCC			Nearby
Rufous hummingbird	<i>Selasphorus rufus</i>	BCC			Very close
Allen's hummingbird	<i>Selasphorus sasin</i>	BCC			In region
Yuma Ridway's rail	<i>Rallus obsoletus yumanensis</i>	FE, CT, CFP	Yes		In region
American avocet	<i>Recurvirostra americana</i>	BCC			Very close
Mountain plover	<i>Charadrius montanus</i>	SSC2, BCC			In region
Snowy plover	<i>Charadrius nivosus</i>	BCC			In region
Western snowy plover	<i>Charadrius nivosus nivosus</i>	FT, SSC			In region
Long-billed curlew	<i>Numenius americanus</i>	WL			Very close
Marbled godwit	<i>Limosa fedoa</i>	BCC			In region
Black turnstone	<i>Arenaria melanocephala</i>	BCC			In region
Red knot	<i>Calidris canutus</i>	BCC			In region
Pectoral sandpiper	<i>Calidris melanotos</i>	BCC			In region
Short-billed dowitcher	<i>Limnodromus griseus</i>	BCC			In region
Lesser yellowlegs	<i>Tringa flavipes</i>	BCC			In region
Willet	<i>Tringa semipalmata</i>	BCC			In region
Laughing gull	<i>Leucophaeus atricilla</i>	WL			In region
Franklin's gull	<i>Leucophaeus pipixcan</i>	BCC			In region
Heermann's gull	<i>Larus heermanni</i>	BCC			In region
Western gull	<i>Larus occidentalis</i>	BCC			In region
Yellow-footed gull	<i>Larus livens</i>	BCC			In region
California gull	<i>Larus californicus</i>	BCC, WL			Very close/ On site
California least tern	<i>Sternula antillarum browni</i>	FE, CE, CFP			In region
Gull-billed tern	<i>Gelochelidon nilotica</i>	BCC, SSC3			In region
Black tern	<i>Chlidonias niger</i>	SSC2, BCC			In region
Elegant tern	<i>Thalasseus elegans</i>	BCC, WL			In region
Black skimmer	<i>Rynchops niger</i>	BCC, SSC3			In region
Common loon	<i>Gavia immer</i>	SSC			Nearby
Double-crested cormorant	<i>Phalacrocorax auritus</i>	WL			Very close/ On site
American white pelican	<i>Pelicanus erythrorhynchos</i>	SSC1			Very close
Least bittern	<i>Ixobrychus exilis</i>	SSC2			In region

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Reddish egret	<i>Egretta rufescens</i>	BCC			In region
White-faced ibis	<i>Plegadis chihi</i>	WL			Very close
Turkey vulture	<i>Cathartes aura</i>	BOP			Very close/ On site
Osprey	<i>Pandion haliaetus</i>	WL, BOP			Very close
White-tailed kite	<i>Elanus leucurus</i>	CFP, BOP			In region
Golden eagle	<i>Aquila chrysaetos</i>	BGEPA, CFP, BOP, WL		Moderate	Nearby
Northern harrier	<i>Circus cyaneus</i>	BCC, SSC3, BOP			Very close
Sharp-shinned hawk	<i>Accipiter striatus</i>	WL, BOP			Very close
Cooper's hawk	<i>Accipiter cooperii</i>	WL, BOP			Very close/ Just off site
Bald eagle	<i>Haliaeetus leucocephalus</i>	CE, BGEPA, BOP			Nearby
Red-shouldered hawk	<i>Buteo lineatus</i>	BOP			Very close
Swainson's hawk	<i>Buteo swainsoni</i>	CT, BOP			Very close
Red-tailed hawk	<i>Buteo jamaicensis</i>	BOP			Very close
Ferruginous hawk	<i>Buteo regalis</i>	WL, BOP			Nearby
Zone-tailed hawk	<i>Buteo albonotatus</i>	BOP			Nearby
Harris' hawk	<i>Parabuteo unicinctus</i>	WL, BOP			In region
American barn owl	<i>Tyto furcata</i>	BOP			Very close
Western screech-owl	<i>Megascops kennicotti</i>	BOP			Very close
Great horned owl	<i>Bubo virginianus</i>	BOP			Very close
Burrowing owl	<i>Athene cunicularia</i>	BCC, SSC2, BOP, CCE	Yes	Moderate	Nearby
Long-eared owl	<i>Asio otus</i>	BCC, SSC3, BOP			In region
Short-eared owl	<i>Asia flammeus</i>	BCC, SSC3, BOP			Nearby/ On site
Northern saw-whet owl	<i>Aegolius acadicus</i>	BOP			In region
Lewis's woodpecker	<i>Melanerpes lewis</i>	BCC			In region
Nuttall's woodpecker	<i>Picoides nuttallii</i>	BCC			Nearby
American kestrel	<i>Falco sparverius</i>	BOP			Very close/ On site
Merlin	<i>Falco columbarius</i>	WL, BOP			Very close

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Peregrine falcon	<i>Falco peregrinus</i>	BOP			Very close/ On site
Prairie falcon	<i>Falco mexicanus</i>	WL, BOP			Very close
Olive-sided flycatcher	<i>Contopus cooperi</i>	BCC, SSC2			Very close
Willow flycatcher	<i>Empidonax trailii</i>	CE			Very close
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE, CE	Yes	Not expected	In range
Brown-crested flycatcher	<i>Myiarchus tyrannulus</i>	WL			In region
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>	SSC2		Moderate	Very close
Least Bell's vireo	<i>Vireo bellii pusillus</i>	FE, CE	Yes	Not expected	In region
Gray vireo	<i>Vireo vicinior</i>	SSC2	Yes		In region
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSC2		Moderate	Very close
Oak titmouse	<i>Baeolophus inornatus</i>	BCC			Nearby
Verdin	<i>Auriparus flaviceps</i>	BCC			Very close/ On site
California horned lark	<i>Eremophila alpestris actia</i>	WL			Very close
Bank swallow	<i>Riparia riparia</i>	CT			Nearby
Purple martin	<i>Progne subis</i>	SSC2			Nearby
Wrentit	<i>Chamaea fasciata</i>	BCC			In region
Black-tailed gnatcatcher	<i>Polioptila melanura</i>	WL			Very close
Bendire's thrasher	<i>Toxostoma bendirei</i>	SSC3, BCC		Not expected	In region
California thrasher	<i>Toxostoma redivivum</i>	BCC			In region
LeConte's thrasher	<i>Toxostoma lecontei</i>	SSC1, BCC	Yes	Not expected	Very close
Crissal thrasher	<i>Toxostoma crissale</i>	SSC3	Yes	Not expected	In region
Cassin's finch	<i>Haemorhous cassinii</i>	BCC			Very close
Lawrence's goldfinch	<i>Spinus lawrencei</i>	BCC			Very close
Grasshopper sparrow	<i>Ammodramus savannarum</i>	SSC2			In region
Black-chinned sparrow	<i>Spizella atrogularis</i>	BCC			In region
Gray-headed junco	<i>Junco hyemalis caniceps</i>	WL			Nearby
Bell's sparrow	<i>Amphispiza b. belli</i>	WL			In region
Oregon vesper sparrow	<i>Pooecetes gramineus affinis</i>	SSC2			In range
Southern California rufous-crowned sparrow	<i>Aimophila ruficeps canescens</i>	WL			In region

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Yellow-breasted chat	<i>Icteria virens</i>	SSC3	Yes		Very close
Yellow-headed blackbird	<i>X. xanthocephalus</i>	SSC3			Very close
Bullock's oriole	<i>Icterus bullockii</i>	BCC			Very close
Tricolored blackbird	<i>Agelaius tricolor</i>	CT, BCC, SSC1			In region
Lucy's warbler	<i>Leiothlypis luciae</i>	SSC3			Nearby
Virginia's warbler	<i>Leiothlypis virginiae</i>	WL, BCC			In region
Northern yellow warbler	<i>Setophaga aestiva</i>	SSC2	Yes		Very close
Summer tanager	<i>Piranga rubra</i>	SSC1	Yes		Very close
California leaf nosed bat	<i>Macrotus californicus</i>	SSC, WBWG: H			In region
Yuma myotis	<i>Myotis yumanensis</i>	WBWG: LM			In region
Long-eared myotis	<i>Myotis evotis</i>	WBWG: M			In region
Fringed myotis	<i>Myotis thysanodes</i>	WBWG: H			In region
Long-legged myotis	<i>Myotis volans</i>	WBWG: H			In region
California myotis	<i>Myotis californicus</i>	WBWG:L			In region
Small-footed myotis	<i>Myotis ciliolabrum</i>	WBWG: M			In region
Canyon bat	<i>Parastrellus hesperus</i>	WBWG: M			Nearby
Big brown bat	<i>Episticus fuscus</i>	WBWG: L			In region
Silver-haired bat	<i>Lasionycteris noctivagans</i>	WBWG: M			In region
Hoary bat	<i>Lasiurus cinereus</i>	WBWG: M			In region/ Possible on site
Western red bat	<i>Lasiurus blossevillii</i>	SSC, WBWG: H			In range
Western yellow bat	<i>Lasiurus xanthinus</i>	SSC, WBWG: H	Yes	Moderate	In region
Spotted bat	<i>Euderma maculatum</i>	SSC, WBWG: H			In range/ Possible on site
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SSC, WBWG: H			In region
Pallid bat	<i>Antrozous pallidus</i>	SSC, WBWG: H			Nearby
Mexican free-tailed bat	<i>Tadarida brasiliensis</i>	WBWG: L			In region
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	SSC, WBWG: M		Not expected	In region
Big free-tailed bat	<i>Nyctinomops macrotis</i>	SSC, WBWG: MH			In range
Western mastiff bat	<i>Eumops perotis</i>	SSC, WBWG: H		Moderate	In range

Common name	Species name	Status¹	CVMSHCP Cover?	MBI	Database records, Surveys
Palm Springs round-tailed ground squirrel	<i>Xerospermophilus tereticaudus chlorus</i>	SSC	Yes	Not expected	Nearby
Palm Springs pocket mouse	<i>Perognathus longimembris bangsi</i>	SSC	Yes	Not expected	In region
Pallid San Diego pocket mouse	<i>Chaetodipus fallax pallidus</i>	SSC		Not expected	In region
Los Angeles pocket mouse	<i>Perognathus longimembris brevinasus</i>	SSC			In region
San Diego Bryant's woodrat	<i>Neotoma lepida intermedia</i>	SSC		Not expected	In region
Southern grasshopper mouse	<i>Onychomys torridus ramona</i>	SSC			In region
American badger	<i>Taxidea taxus</i>	SSC		Not expected	In region
Mountain lion	<i>Puma concolor</i>	SA			In region
Peninsular bighorn sheep DPS	<i>Ovis canadensis pop. 2</i>	FE, CT, CFP	Yes	Not expected	Nearby

¹ Listed on CDFW's Special Animals List (<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406>) as FT or FE = federal threatened or endangered; FC = federal candidate for listing; BGEPA = Bald and Golden Eagle Protection Act; CT or CE = California threatened or endangered; CCT or CCE = Candidate California threatened or endangered; CFP = California Fully Protected (California Fish and Game Code 3511); SSC_i = California Species of Special Concern with *i* = priorities 1, 2 and 3; WL = CDFW's Taxa to Watch List; WBWG = Western Bat Working Group with priority rankings, of low (L), moderate (M), and high (H); BCC = U.S. Fish and Wildlife Service's Bird of Conservation Concern (<https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf>); and BOP = protected by Birds of Prey (California Fish and Game Code 3503.5, see <https://wildlife.ca.gov/Conservation/Birds/Raptors>).

MBI (2025) considers the occurrence likelihoods of 28 (19%) of the special-status species listed in Table 2, which means that 118 (81%) of the special-status species in Table 2 were screened out of the analysis in the first step of the desktop review. Of the 28 species assessed, MBI (2025) determines 20 of them as “Not expected” to occur on site, but two of those species have been documented within 1.5 miles of the site, and another four of those species have been documented between 1.5 and 4 miles of the site. In summary, MBI’s determinations of occurrence likelihoods comport only poorly with survey results and with available occurrence records in the region.

The IS/MND (p. 4-20) concludes that “Due to the disturbed nature of the project site and lack of native habitat, red-diamond rattlesnake are not expected to be present in large numbers, if at all. Therefore, potential impacts would not drop regional populations below self-sustaining levels and are considered less than significant.” This same conclusion, word for word, is repeated for red-diamond rattlesnake and Coast horned lizard. However, for none of these species does the IS/MND disclose any sort of measured relationship between occurrence likelihood and degrees of disturbance. Nor does the IS/MND disclose any information about the status of any of these species’ populations in the area of the project. Nor does the IS/MND disclose the self-sustaining populations of regional populations below which would be significant. The bases of these conclusions in the IS/MND are entirely speculative.

At least a fair argument can be made for the need to prepare an EIR to appropriately survey the project site for wildlife, to more carefully analyze the survey results, and to more accurately characterize the wildlife and plant communities as parts of the existing environmental setting. These steps are needed to accurately predict impacts and to formulate an appropriate mitigation strategy (see below).

Mischaracterization of the Wildlife Community

MBI (2025) reports on field surveys and desktop review having been performed, but the field survey results are interpreted without any context to survey results from elsewhere, and without any reference to the detection probabilities of special-status species that should be expected of a four-hour reconnaissance survey. The desktop review starts with an inappropriately small pool of special-status species after misusing the CNDDB and having not used eBird and iNaturalist. Furthermore, MBI (2025) too often resorts to speculation in its analyses of occurrence likelihoods, having not completed surveys appropriate to bats and fossorial small mammals and having committed too little survey effort overall. Speculated habitat assessments are highly uncertain, which is inappropriate for precious or rare resources such as special-status species (National Research Council 1986). The true wildlife community remains to be described. Without a more accurate characterization of the wildlife community, the basis is inadequate for predicting impacts and formulating appropriate mitigation strategies.

BIOLOGICAL IMPACTS ASSESSMENT

The impacts analysis in CEQA review involves prediction. Predictions are necessary because measuring a project’s impacts directly cannot happen until after impacts occur,

and the timing of this type of measurement would come too late for the formulations of avoidance and minimization mitigation strategies that are prioritized by the CEQA. Impact predictions are necessary as part of the environmental review. The accuracy of predicting impacts and determining their significance ultimately relies on the degree of accuracy in the characterization of the existing environmental setting (Figure 5).

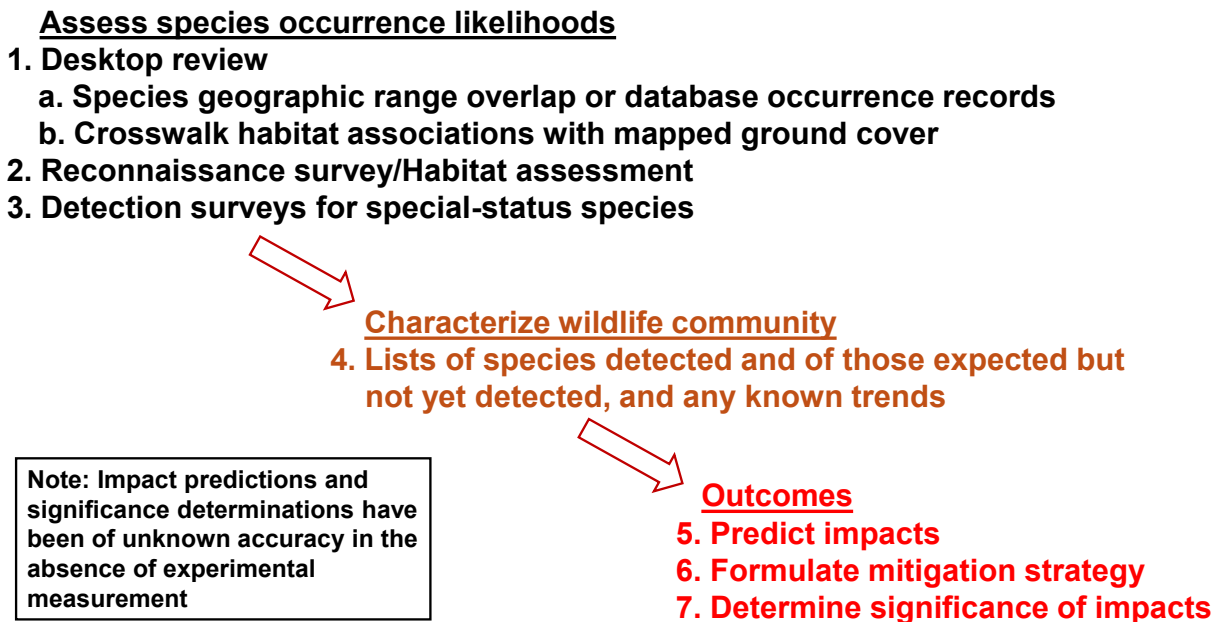


Figure 5. General flow of information from the gathering stage through the characterization of the existing environment to predictions of impacts and their significance.

Impact predictions can derive from speculation or from experience (Figure 6). Speculation is repeatedly discouraged in the CEQA Guidelines, because speculation is an inconclusive guess or ponderance on a phenomenon without the benefit of data. Prediction accuracy improves with experience, though the experience that can be brought to bear on impact predictions ranges from anecdotes to careful use of scientific inference. Inference is a conclusion derived logically from data that are available about a phenomenon. Any type of experience is usually better than relying on speculation, but careful scientific inference, especially inference drawn from experiments, has proven most effective. An analogy would be predicting the boiling temperature of water at a certain place with a known atmospheric pressure after having measured it hundreds of times at other places under various atmospheric pressures. The experience of measuring the boiling temperature at all these other places would certainly result in a more accurate prediction of the boiling point as compared to a speculative prediction. We know that use of inference in this example is *certainly* more predictive, and not *potentially* more predictive, because we have a long successful history with the application of this type of experimentation to draw predictive inference.

The many projects that have undergone CEQA review provide a comparative basis for drawing inferences needed to predict the impacts of the next proposed project (Figure

6). Reconnaissance survey results that are not compared to survey results from other project sites miss the opportunity to interpret the results for the purpose of predicting impacts. The same is true of CDNNB occurrence records. For example, it would be helpful to know how often a species lacking CNDDDB occurrence records on a site is nevertheless detected onsite by reconnaissance survey(s). It would be helpful to know how often the impact predictions of other projects are proven accurate, and how often the required mitigation measures are proven effective. The comparative method enables the use of scientific inference over speculation and the blind confidence of simply repeating impact conclusions of unknown accuracy and mitigation strategies of unknown efficacy.

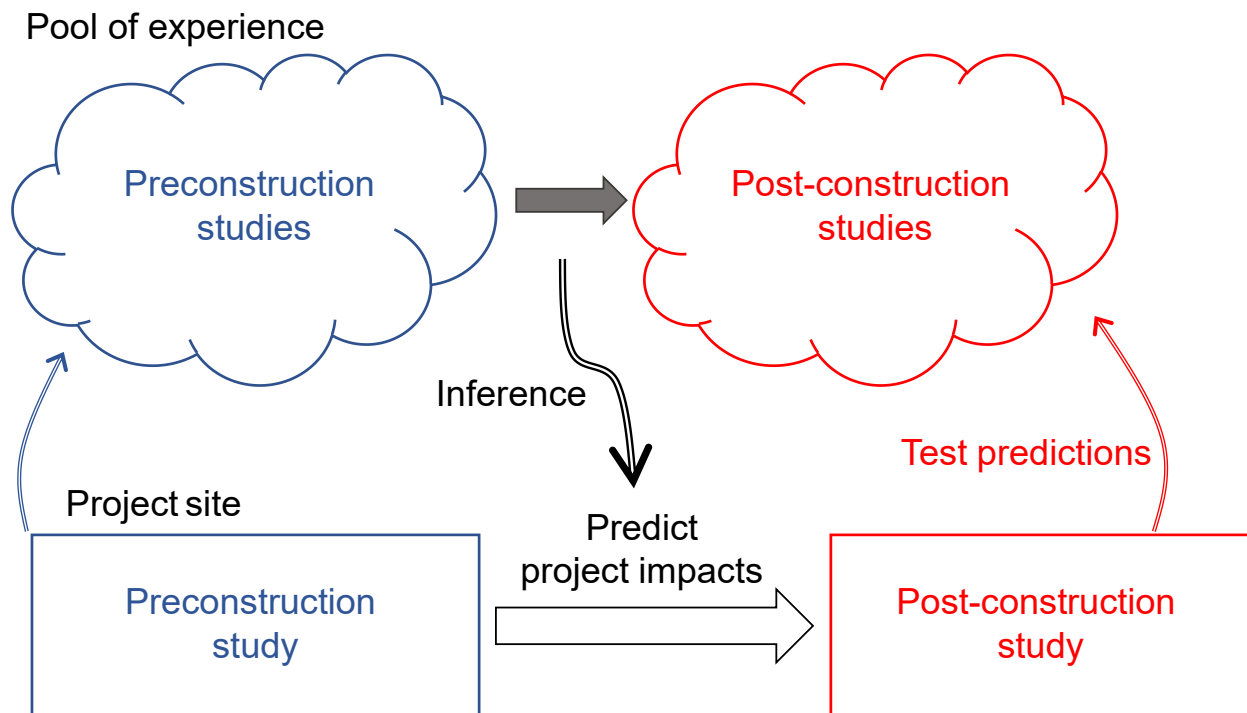


Figure 6. A framework for arriving at predicted project impacts based on experience with other project sites. Ideally, there is a pool of similar projects in similar circumstances where predicted impacts were compared to realized impacts, and into which the proposed project can also contribute to experience.

In the following, I analyze several types of impacts likely to result from the project, none of which are analyzed adequately in the IS/MND, and some of which are not analyzed at all.

REDUCED PRODUCTIVE CAPACITY FROM HABITAT LOSS

Habitat loss results in a reduced productive capacity of affected wildlife species. The site is proven to serve as habitat to at least 35 species of vertebrate wildlife which Noriko and MBI observed on the site, but the number of avian nest sites remains unknown. Because Noriko's survey was only a reconnaissance survey during the non-breeding

season, and therefore unsuitable for detecting all bird nests on the site, estimating total nest density of birds was not possible. The alternative method would be to infer productive capacity from estimates of total nest density elsewhere. Noriko has completed several studies to estimate total avian nest density in similar environments in the local area.

Noriko estimated 5.56 nests/acre on a 3.6-acre site of ruderal grassland bordering a woodland strip in Murrieta, and 1.86 nests/acre on another 4.83-acre grassland site bordering a strip of woodland in Murietta. The average of the above two estimates is 3.71 nests/acre. Assuming this average density accurately represents the total nest density of the project site, with its sparser ground cover but larger number of trees than at Noriko's study sites, this density applied to the 77.8 acres of the project site would predict 289 nest sites. Assuming 1.39 broods per nest site based on a review of 322 North American bird species, which averaged 1.39 broods per year, then I estimate 402 nest attempts per year on the project site. Assuming Young's (1948) study site typifies bird productivity of 2.9 fledged birds per nest attempt, then I predict 1,166 fledglings/year at the project site.

The loss of 289 nest sites and 402 nest attempts per year would qualify as significant impacts not yet analyzed in the IS/MND. But the impacts would not end with the immediate loss of nest sites. The reproductive capacity of the site would be lost. The project would prevent the production of 1,166 fledglings per year. Assuming an average bird generation time of 4 years, the lost capacity of both breeders and annual fledgling production can be estimated from an equation in Smallwood (2022): $\{(nests/year \times chicks/nest \times number\ of\ years) + (2\ adults/nest \times nests/year) \times (number\ of\ years \div years/generation)\} \div (number\ of\ years) = 1,311\ birds\ per\ year\ denied\ to\ California.$

The loss of 1,311 birds per year would be a loss of significant habitat value that is currently provided by the project site. Most if not all these birds are protected by the federal Migratory Bird Treaty Act and by California's Migratory Bird Protection Act, both of which are intended to most strongly protect breeding migratory birds. The loss of 1,311 birds would easily qualify as an unmitigated significant impact.

INTERFERENCE WITH WILDLIFE MOVEMENT

One of CEQA's principal concerns regarding potential project impacts is whether a proposed project would interfere with wildlife movement in the region. The species Noriko and MBI (2025) detected on the project site had at some point moved to the site, and in fact members of some of these species were in flight when Noriko detected them. At minimum, the project site provides wildlife with stopover opportunities during migration or dispersal of young. However, the IS/MND focuses too much on the red-herring question of whether the site occurs within a movement corridor. The question is a red herring because the CEQA standard applies to all types of movement and not just the movement channeled by corridors.

The IS/MND (p. 4-22) concludes, "The project site is highly disturbed from the former golf course use and is surrounded on all sides by existing development. Further, the site

offers no connectivity to any natural habitats that would serve as migration corridors, nor do adjacent areas. No impact to native wildlife movement or wildlife corridors would occur.” As noted above, the analysis focuses too much on whether could serve as a wildlife movement corridor. However, whether the site serves as a wildlife movement corridor is not the only consideration when it comes to the standard CEQA Checklist question of whether the project would interfere with wildlife movement in the region. The primary phrase of the CEQA standard goes to wildlife movement regardless of whether the movement is channeled by a corridor. Wildlife are obviously using the site, so they are able to travel to and from the site. Most of the birds recorded at the site are migratory birds, and the site is one of the last remaining patches of open space available to birds that need to move through the region. The project site is important to wildlife movement in the region.

Furthermore, the IS/MND’s conclusion is based on no program of observation. There was no study design or specific field method implemented to quantify or characterize wildlife movement across the project site or beyond. A simple program of observation, for example, would have been to perform timed surveys on stations located at intervals across the site, and to have had observers plot wildlife travel paths on handheld maps. Another would be to use a thermal-imaging camera to track and record animal movements at night, including terrestrial mammals, birds and bats. But MBI (2025) reports nothing like these types of observations, and its analysis of wildlife movement and whether the project would interfere with it is therefore limited to speculation. Speculation is an unsound basis for making important determinations.

TRAFFIC IMPACTS ON WILDLIFE

The IS/MND neglects to address one of the project’s most obvious, substantial impacts to wildlife, and that is wildlife mortality and injuries caused by project-generated traffic. Project-generated traffic would endanger wildlife that must, for various reasons, cross roads used by the project’s traffic (Photos 15–18), including along roads far from the project footprint but which would nevertheless be traversed by automobiles head to or from the project’s building. Vehicle collisions have accounted for the deaths of many thousands of amphibian, reptile, mammal, bird, and arthropod fauna, and the impacts have often been found to be significant at the population level (Forman et al. 2003). Across North America traffic impacts have taken devastating tolls on wildlife (Forman et al. 2003). In Canada, 3,562 birds were estimated killed per 100 km of road per year (Bishop and Brogan 2013), and the US estimate of avian mortality on roads is 2,200 to 8,405 deaths per 100 km per year, or 89 million to 340 million total per year (Loss et al. 2014). Local impacts can be more intense than nationally.



Photo 15. *A desert cottontail runs across the road just in Murietta, California. Such road crossings are usually successful, but too often prove fatal to the animal.*



Photo 16. *A great-tailed grackle crosses a road in the Imperial Valley.*



Photos 17 and 18. *Raccoon killed on Road 31 just east of Highway 505 in Solano County (left; photo taken on 10 November 2018), and California kingsnake killed by a vehicle on a rural road in El Dorado County in 2024.*

The nearest study of traffic-caused wildlife mortality was performed along a 2.5-mile stretch of Vasco Road in Contra Costa County, California. Fatality searches in this study found 1,275 carcasses of 49 species of mammals, birds, amphibians and reptiles over 15 months of searches (Mendelsohn et al. 2009). This fatality number needs to be adjusted for the proportion of fatalities that were not found due to scavenger removal and searcher error. This adjustment is typically made by placing carcasses for searchers to find (or not find) during their routine periodic fatality searches. This step was not taken at Vasco Road (Mendelsohn et al. 2009), but it was taken as part of another study next to Vasco Road (Brown et al. 2016). Brown et al.'s (2016) adjustment factors for carcass persistence resembled those of Santos et al. (2011). Also applying searcher detection rates from Brown et al. (2016), the adjusted total number of fatalities was estimated at 9,462 animals killed by traffic on the road. This fatality number projected over 1.25 years and 2.5 miles of road translates to 3,028 wild animals per mile per year. In terms comparable to the national estimates, the estimates from the Mendelsohn et al. (2009) study would translate to 188,191 animals killed per 100 km of road per year, or 22 times that of Loss et al.'s (2014) upper bound estimate and 53 times the Canadian estimate. An analysis is needed of whether increased traffic generated by the project site would similarly result in local impacts on wildlife.

For wildlife vulnerable to front-end collisions and crushing under tires, road mortality can be predicted from the study of Mendelsohn et al. (2009) as a basis, although it would be helpful to have the availability of more studies like that of Mendelsohn et al. (2009) at additional locations. My analysis of the Mendelsohn et al. (2009) data resulted in an estimated 3,028 animals killed per mile along a county road in Contra Costa County. The estimated numbers of fatalities were 1.75% birds, 26.4% mammals (many mice and pocket mice, but also ground squirrels, desert cottontails, striped skunks, American badgers, raccoons, and others), 67.4% amphibians (large numbers of California tiger salamanders and California red-legged frogs, but also Sierran treefrogs,

western toads, arboreal salamanders, slender salamanders and others), and 4.4% reptiles (many western fence lizards, but also skinks, alligator lizards, and snakes of various species). VMT is useful for predicting wildlife mortality because I was able to quantify miles traveled along the studied reach of Vasco Road during the time period of the Mendelsohn et al. (2009), hence enabling a rate of fatalities per VMT that can be projected to other sites, assuming similar collision fatality rates.

Predicting project-generated traffic impacts on wildlife

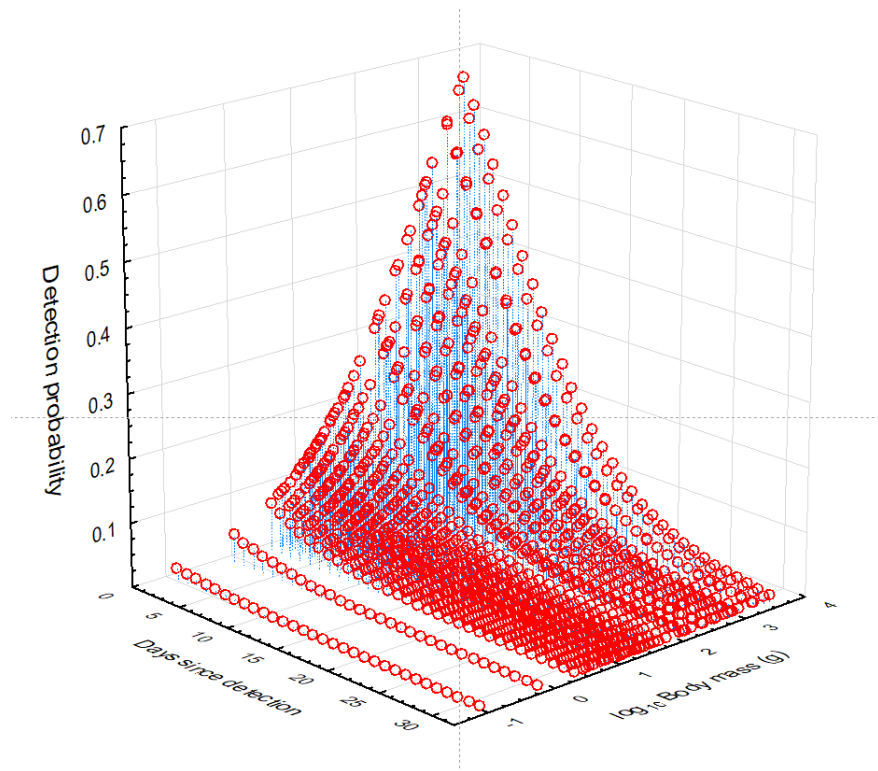
The IS/MND predicts 22,304,455 annual VMT would be generated by the project. During the Mendelsohn et al. (2009) study, 19,500 cars traveled Vasco Road in Contra Costa County daily, so the vehicle miles that contributed to my estimate of non-volant fatalities was $19,500 \text{ cars and trucks} \times 2.5 \text{ miles} \times 365 \text{ days/year} \times 1.25 \text{ years} = 22,242,187.5 \text{ vehicle miles}$ per 9,462 wildlife fatalities, or 2,351 vehicle miles per fatality. This rate divided into the predicted annual VMT would predict 4,004 vertebrate wildlife fatalities per year due to project-generated traffic. However, some could argue that the mortality along Vasco Road is unrepresentative of the mortality that would be caused by traffic along roads across a more residential landscape. I therefore initiated my own road mortality study along residential roads.

I studied wildlife-automobile collision mortality in Davis, California with the aims of quantifying mortality on urban streets and basing the estimate on daily pedestrian surveys rather than the weekly pedestrian surveys that had been conducted on Vasco Road. After one year of surveys on 2.7 km of local, collector and minor arterial roads in north Davis, 9 September 2024 through 9 September 2025, I tallied 330 fatalities of 46 species of wildlife. Most of the fatalities were small-bodied animals such as Sierran treefrogs, western toads, western fence lizards, 10" to 16" juvenile Pacific gophersnakes, valley gartersnakes and California kingsnakes, as well as deer mice and California ground squirrels. Most of the animals I found would never have been detected from a moving vehicle, which is why many people underestimate how many wild animals are killed by vehicle traffic.

The animals I found in my study were not all the animals killed by vehicles on the roads I searched. The carcasses of many fatalities had been removed by scavengers before I could find them. (American crows patrol the roads every morning, and so does a large flock of wild turkeys.) Some collision victims are knocked off the road in places where I could never find them, and some are undoubtedly caught in grills or in tire treads and carried away. Most of the Sierran treefrogs disappeared from where I found them within several hours, so daily searches still missed many of the fatalities. To adjust for these undetected fatalities, I fit a logit regression model to my fatality finds, all of which transitioned to carcass detection trials after I initially found them. Starting with the first day after each detection, I monitored the carcass trials for 30 days, and I assigned each a body mass estimate based on typical body mass reported in the literature. Predictor variables were days since detection and $\log_{10}$ body mass. The relationship between carcass detection probability and the predictor variables is depicted in Figure 7. My fatality finds adjusted by the model results in an estimate of 2,235 fatalities over 2.7 km of roads in one year, or 827.8 fatalities/km/year. This rate is 35% of the rate measured

at Vasco Road. Applying this urban fatality rate to the VMT predicted for the project would predict 1,401 fatalities. A reasonable mortality prediction range for the project would be 1,401 to 4,004 wildlife fatalities per year.

Figure 7. *Wildlife carcass detection probability is a function of the number of days since discovery and $\log_{10}$ body mass. Carcass detection probability rapidly declines with time since discovery and with lower body mass.*



Based on my analysis, the project-generated traffic would cause substantial, significant impacts on wildlife. The IS/MND does not address this potential impact, let alone propose to mitigate it. Mitigation measures to improve wildlife safety along roads are available and are feasible, and they need exploration for their suitability with the proposed project. Given the predicted level of project-generated traffic-caused mortality, and the lack of any proposed mitigation, it is my opinion that the proposed project would result in potentially significant adverse biological impacts, and that, as the IS/MND is currently written, these impacts would be unmitigated.

BIRD-WINDOW COLLISION MORTALITY

The project would introduce glass windows into an essential portion of avian habitat – that portion of the gaseous atmosphere that is referred to as the aerosphere (Davy et al. 2017, Diehl et al. 2017). The aerosphere is where birds and bats and other volant animals with wings migrate, disperse, forage, perform courtship and where some of them mate. Birds are some of the many types of animals that evolved wings as a morphological adaptation to thrive by moving through the medium of the aerosphere. The aerosphere is habitat, to which an entire discipline of ecology has emerged to study this essential aspect of habitat – the discipline of aeroecology (Kunz et al. 2008).

Many special-status species of birds have been recorded at or near the aerosphere of the project site. My database review and Noriko's site visit indicate there are 101 special-status species of birds with potential to use the site's aerosphere (Table 1). All the birds represented in Table 1 can quickly fly from wherever they have been documented to the project site, so they would all be within brief flights to the proposed project's windows. Noriko confirmed 48 vertebrate wildlife species on the project site, some of them flying across the site.

Window collisions are often characterized as either the second or third largest source or human-caused bird mortality. The numbers behind these characterizations are often attributed to Klem's (1990) and Dunn's (1993) estimates of about 100 million to 1 billion bird fatalities in the USA, or more recently by Loss et al.'s (2014) estimate of 365-988 million bird fatalities in the USA or Calvert et al.'s (2013) and Machtans et al.'s (2013) estimates of 22.4 million and 25 million bird fatalities in Canada, respectively. The proposed project would impose windows in the airspace normally used by birds.

Glass-façades of buildings intercept and kill many birds, but they are differentially hazardous to birds based on spatial extent, contiguity, orientation, and other factors. At Washington State University, Johnson and Hudson (1976) found 266 bird fatalities of 41 species within 73 months of monitoring of a three-story glass walkway (no fatality adjustments attempted). Prior to marking the windows to warn birds of the collision hazard, the collision rate was 84.7 per year. At that rate, and by not attempting to adjust the fatality estimate for the proportion of fatalities not found, 4,574 birds were likely killed over the 54 years since the start of their study, and that's at a relatively small building façade. Accounting for the proportion of fatalities not found in searches, the number of birds killed by this walkway over the last 54 years would have been about 14,270. And this is just for one 3-story, glass-sided walkway between two college campus buildings.

Klem's (1990) estimate was based on speculation that 1 to 10 birds are killed per building per year, and this speculated range was extended to the number of buildings estimated by the US Census Bureau in 1986. Klem's speculation was supported by fatality monitoring at only two houses, one in Illinois and the other in New York. Also, the basis of his fatality rate extension has changed greatly since 1986. Whereas his estimate served the need to alert the public of the possible magnitude of the bird-window collision issue, it was highly uncertain at the time and undoubtedly outdated more than three decades hence. Indeed, by 2010 Klem (2010) characterized the upper end of his estimated range – 1 billion bird fatalities – as conservative. Furthermore, the estimate lumped species together as if all birds are the same and the loss of all birds to windows has the same level of impact.

By the time Loss et al. (2014) performed their effort to estimate annual USA bird-window fatalities, many more fatality monitoring studies had been reported or were underway. Loss et al. (2014) incorporated many more fatality rates based on scientific monitoring, and they were more careful about which fatality rates to include. However, they included estimates based on fatality monitoring by homeowners, which in one study were found to detect only 38% of the available window fatalities (Bracey et al.

2016). Loss et al. (2014) excluded all fatality records lacking a dead bird in hand, such as injured birds or feather or blood spots on windows. Loss et al.'s (2014) fatality metric was the number of fatalities per building (where in this context a building can include a house, low-rise, or high-rise structure), but they assumed that this metric was based on window collisions. Because most of the bird-window collision studies were limited to migration seasons, Loss et al. (2014) developed an admittedly assumption-laden correction factor for making annual estimates. Also, only two of the studies included adjustments for carcass persistence and searcher detection error, and it was unclear how and to what degree fatality rates were adjusted for these factors. Although Loss et al. (2014) attempted to account for some biases as well as for large sources of uncertainty mostly resulting from an opportunistic rather than systematic sampling data source, their estimated annual fatality rate across the USA was highly uncertain and vulnerable to multiple biases, most of which would have resulted in fatality estimates biased low.

In my review of bird-window collision monitoring, I found that the search radius around homes and buildings was very narrow, usually 2 meters. Based on my experience with bird collisions in other contexts, I would expect that a large portion of bird-window collision victims would end up farther than 2 m from the windows, especially when the windows are higher up on tall buildings. In my experience, searcher detection rates tend to be low for small birds deposited on ground with vegetation cover or woodchips or other types of organic matter. Also, vertebrate scavengers entrain on anthropogenic sources of mortality and quickly remove many of the carcasses, thereby preventing the fatality searcher from detecting these fatalities. Adjusting fatality rates for these factors – search radius bias, searcher detection error, and carcass persistence rates – would greatly increase nationwide estimates of bird-window collision fatalities.

Buildings can intercept many nocturnal migrants as well as birds flying in daylight. As mentioned above, Johnson and Hudson (1976) found 266 bird fatalities of 41 species within 73 months of monitoring of a four-story glass walkway at Washington State University (no adjustments attempted for undetected fatalities). Somerlot (2003) found 21 bird fatalities among 13 buildings on a university campus within only 61 days. Monitoring twice per week, Hager et al. (2008) found 215 bird fatalities of 48 species, or 55 birds/building/year, and at another site they found 142 bird fatalities of 37 species for 24 birds/building/year. Gelb and Delacretaz (2009) recorded 5,400 bird fatalities under buildings in New York City, based on a decade of monitoring only during migration periods, and some of the high-rises were associated with hundreds of fatalities each. Klem et al. (2009) monitored 73 building façades in New York City during 114 days of two migratory periods, tallying 549 collision victims, nearly 5 birds per day. Borden et al. (2010) surveyed a 1.8 km route 3 times per week during 12-month period and found 271 bird fatalities of 50 species. Parkins et al. (2015) found 35 bird fatalities of 16 species within only 45 days of monitoring under 4 building façades. From 24 days of survey over a 48-day span, Porter and Huang (2015) found 47 fatalities under 8 buildings on a university campus. Sabo et al. (2016) found 27 bird fatalities over 61 days of searches under 31 windows. In San Francisco, Kahle et al. (2016) found 355 collision victims within 1,762 days under a 5-story building. Ocampo-Peñuela et al. (2016) searched the perimeters of 6 buildings on a university campus, finding 86 fatalities after 63 days of surveys. One of these buildings produced 61 of the 86 fatalities,

and another building with collision-deterrent glass caused only 2 of the fatalities, thereby indicating a wide range in impacts likely influenced by various factors. There is ample evidence available to support my prediction that the proposed project would result in many collision fatalities of birds.

Project Impact Prediction

By the time of these comments, I had reviewed and processed results of bird collision monitoring at 213 buildings and façades for which bird collisions per m² of glass per year could be calculated and averaged (Johnson and Hudson 1976, O'Connell 2001, Somerlot 2003, Hager et al. 2008, Borden et al. 2010, Hager et al. 2013, Porter and Huang 2015, Parkins et al. 2015, Kahle et al. 2016, Ocampo-Peñuela et al. 2016, Sabo et al. 2016, Barton et al. 2017, Gomez-Moreno et al. 2018, Schneider et al. 2018, Loss et al. 2019, Brown et al. 2020, City of Portland Bureau of Environmental Services and Portland Audubon 2020, Riding et al. 2020). These study results averaged 0.073 bird deaths per m² of glass per year (95% CI: 0.042-0.102). This average and its 95% confidence interval provide a robust basis for predicting fatality rates at a proposed new project.

With the estimated average bird collision mortality above, all I need are estimates of window extents in the project. The IS/MND does not predict the extents of windows in the project, but it does predict 1,064,700 square feet (sf) of total floor space, which I can compare to the average m² of glass windows relative to the sf of floor space that I have maintained in a database of other single-family residential development projects for which I have been able to measure window extents in renderings of the homes. Assuming 0.015193 m² of glass window extent per sf, then I predict 16,175 m² of windows among residential dwelling units. This extent of windows multiplied against the above-reported average bird collision deaths per m² of glass per year predicts 1,182 (95% CI: 702–1,663) bird collision fatalities per year.

The vast majority of these predicted deaths would be of birds protected under the Migratory Bird Treaty Act and under the California Migratory Bird Protection Act, thus causing significant unmitigated impacts that were not addressed in IS/MND. Given the predicted level of bird-window collision mortality, and the lack of any proposed mitigation, it is my opinion that the proposed project would result in potentially significant adverse biological impacts, including the unmitigated take of both terrestrial and aerial habitat of birds and other sensitive species. Not only would the project take habitat of rare and sensitive species of birds, but it would transform the project's airspace into a lethal collision trap to birds.

At least a fair argument can be made for the need to prepare an EIR to appropriately analyze the project for its potential impacts to birds caused by collisions with windows.

WILDLIFE DEPREDAATION BY HOUSE CATS

Considering national trends, it is safe to assume that house cats would be introduced to the project area by residents of the proposed residential units. This is significant

because house cats serve as one of the largest sources of avian mortality in North America (Dauphiné and Cooper 2009, Blancher 2013, Loss et al. 2013, Loyd et al. 2017). Loss et al. (2013) estimated 139 million cats in the USA in 2013 (range 114 to 164 million), which killed an estimated 16.95 billion vertebrate wildlife annually (range 7.6 to 26.3 billion). In 2012 there were 0.44 house cats per human in the USA, and 122 vertebrate animals were killed per cat, free-ranging members of which killed disproportionately larger numbers of vertebrate wildlife. The Air Quality and GHG chapter of the IS/MND predicts there would be 1,764 new residents in 546 residential units. The above rates of cat ownership applied to this number of new residents would predict 776 new cats, which based on the findings of Loss et al. (2013) would kill 94,672 vertebrate wildlife per year.

House cats also contribute to downstream loading of *Toxoplasma gondii*. According to a UC Davis wildlife health research program, *“Toxoplasma gondii is a parasite that can infect virtually all warm-blooded animals, but the only known definitive hosts are cats – domesticated and feral house cats included. Cats catch the parasite through hunting rodents and birds and they offload it into the environment through their feces... and ...rain that falls on cement creates more runoff than rain that falls on natural earth, which contributes to increased runoff that can carry fecal pathogens to the sea”* (The original link is no longer active, but the quote came from the program described at: <https://whc.vetmed.ucdavis.edu/programs-projects/ca-conservation/sea-otter>).

Impacts to wildlife from the introduction of house cats into the environment would be highly significant, and yet these impacts are not considered in the IS/MND. An obvious mitigation measure would be to constrain house cat ownership such as requiring cats to remain indoors.

CUMULATIVE IMPACTS

The IS/MND's cumulative impacts analysis is flawed. The most fundamental flaw is its assumption that mitigation of a project's direct impacts would prevent cumulative impacts, which is an assumption that is inconsistent with the CEQA's definition of cumulative impacts. According to the IS/MND (p. 4-106), “As concluded in Section 4.1 through Section 4.20, the proposed project would not result in any significant impacts in any environmental categories with implementation of the project mitigation measures. Implementation of mitigation measures at the project-level would reduce the potential for the incremental effects of the proposed project to be considerable when viewed in connection with the effects of past projects, current projects, or probable future projects. Impacts would be less than significant with mitigation incorporated in this regard.” The notion expressed in this passage is that cumulative impacts are really only residual impacts of insufficiently mitigated direct impacts, and that sufficient mitigation of direct impacts would leave no residual impacts and therefore no cumulative impacts. But this is not how cumulative impacts are defined in the CEQA Guidelines. Mitigation directed to the project-level impacts cannot avoid, minimize or reduce the cumulative effects of habitat losses and habitat fragmentation already well underway throughout the region, leaving the project site as one of the last remaining patches of habitat of many special-status species. The loss of habitat on the project site

would contribute cumulatively and very significantly to the loss and fragmentation of habitat regionally.

Having many times encountered the IS/MND's untested claim that project-level mitigation measures prevent significant cumulative impacts argument, while at the same time wildlife species have continued to decline (e.g., Rosenberg et al. 2019, Miller 2024), my co-investigator and I performed an experiment to measure the effects of the purported efficacy of all these project-level mitigation measures. We revisited the project sites we had earlier surveyed as experts to repeat the survey methods at the same time of year, the same start time in the day, and the same methods and survey duration to measure the effects of mitigated development on wildlife. We structured the experiment in a before-after, control-impact experimental design, as some of the sites had been developed since our initial survey and some had remained undeveloped. All the developed sites had included mitigation measures to avoid, minimize or compensate for impacts on wildlife. Nevertheless, we found that mitigated development resulted in a 66% loss of species on site, and 48% loss of species in the project area. Counts of vertebrate animals declined 90%. We reported that "Development impacts measured by the mean number of species detected per survey were greatest for amphibians (-100%), followed by mammals (-86%), grassland birds (-75%), raptors (-53%), special-status species (-49%), all birds as a group (-48%), non-native birds (-44%), and synanthropic birds (-28%). Our results indicated that urban development substantially reduced vertebrate species richness and numerical abundance, even after richness and abundance had likely already been depleted by the cumulative effects of loss, fragmentation, and degradation of habitat in the urbanizing environment," and despite all the mitigation measures and existing policies, regulations, and habitat plans. The reasoning of the IS/MND has been refuted.

At least a fair argument can be made for the need to prepare an EIR to appropriately analyze the project's potential contributions to cumulative impacts on wildlife.

ON THE CITY'S RESPONSES TO CDFW'S COMMENTS

Response 2-5: "The comment states that the assessment of the existing environmental setting has not been adequately analyzed and without a complete, accurate description of the existing environmental setting, the Draft IS/MND may result in an incomplete analysis of project environmental impacts." The response continues by summarizing the descriptions of the environmental setting that are provided in the IS/MND and in MBI (2025), and then it "affirms the Draft IS/MND has provided a complete description of the environmental setting and analysis of environmental impacts. No changes to the Draft IS/MND are necessary nor required in this regard."

Rebuttal: The response simply defends the IS/MND's characterization of the existing environmental setting as complete. It is not. Please see my comments herein under the heading, EXISTING ENVIRONMENTAL SETTING.

Response 2-6: The comment states that the IS/MND lacks a complete assessment of biological resources in regard to burrowing owl and recommends a complete assessment

of the environmental setting, project-related impacts to biological resources and mitigation measures to reduce project impacts to less than significant. Refer to Response to Comment 2-9.

Rebuttal: I referred to Response 2-9, but I disagree with its argument. According to Response 2-9, qualified biologists surveyed the site for suitable burrowing owl burrows on 16 January 2025. The winter is the most difficult period to locate burrowing owls or sign of burrowing owls. Burrowing owls rarely leave sign at winter refuge burrows, and the owls have no reason to expose themselves by staying above-ground during the winter months. In my experience, the detection probability of a winter survey is about 10% of that of a breeding-season survey, and it is for this reason that the CDFW (2012) survey guidelines strongly recommend breeding-season surveys over non-breeding-season surveys. The negative findings of a January survey is just not very compelling.

Another problem with this survey is that its objectives did not mention burrowing owl. The response to CDFW's comment claims that the survey was focused on burrowing owl, but that is not what MBI (2025) states as one of its objectives. Furthermore, the survey was started at noon, which is the worst time for surveying for burrowing owls, especially over winter months. Finally, survey personnel covered 77.8 acres in four hours, or 19.45 acres/hour while pursuing multiple other stated objectives. Added to this is the potential habitat area to the east, which as CDFW points out, should have been surveyed as well.

The rest of Response 2-9 is composed of speculation over reasons why the burrowing owl probably does not occur on the site, and justifying the decision not to perform breeding-season surveys to the standards of CDFW (2012). But this speculation is contradicted by MBI's own determination of a moderate likelihood of occurrence of burrowing owls on the project site. If MBI believes a preconstruction take-avoidance survey is needed, then it needs to also recommend breeding-season surveys consistent with CDFW (2012).

Response 2-7: The comment states that mitigation measures proposed in the IS/MND are not adequate to avoid or reduce impacts to less than significant and recommends additional mitigation measures related to roosting bats, artificial nighttime lighting, nesting birds, and burrowing owl. Refer to Response to Comments 2-8, 2-9, 2-10 and 2-11.

Rebuttal: I referred to Response to Comments 2-8, 2-9, 2-10 and 2-11, but they incompletely and inadequately respond to CDFW's comment.

Response 2-8: ... the commenter believes that Draft IS/MND Mitigation Measure BIO-1 would not adequately reduce impacts to nesting birds to less than significant. The commenter's revisions to Mitigation Measure BIO-1 have been incorporated to Page 4-21 of the Draft IS/MND and are reflected below and in Section 3.0, *Errata*, of the Final IS/MND. ... This change provides a minor update, correction, or clarification and does not represent "significant new information" as defined in CEQA Guidelines Section

15088.5 and would not result in any new or substantially greater significant impacts as compared to those identified in the Draft IS/MND.

BIO-1 Pre-construction Nesting Bird Survey. *To the greatest extent feasible, the Project will avoid construction activities during the peak nesting season (January 15 through September 15). Regardless of the time of year, nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the preconstruction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species-specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Construction activities may not occur inside the established buffers, which shall remain on-site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance.*

Rebuttal: I appreciate that CDFW proposed the language of this measure, but I must point out that the opening statement of the measure is aspirational, but not a requirement to avoid beginning construction during the avian breeding season. This part of the measure is not enforceable.

Should the project go forward, I concur with this measure so long as the language is modified to require that construction avoid the breeding season. However, it needs to be understood that the conservation benefits of this measure would be *de minimis* compared to the project's potential impacts on breeding birds. This measure would not prevent the permanent loss of the avian productive capacity that I predict in my letter herein. Preconstruction, take-avoidance surveys consist of two steps, both of which are very difficult. First, the biologist(s) performing the survey must identify birds that are breeding. Second, the biologist(s) must locate the breeding birds' nests. The first step is typically completed by observing bird behaviors such as food deliveries and nest territory defense. To be successful these types of observations typically require many surveys on many dates spread throughout the breeding season even for a single species. To identify and locate the birds of all species nesting on a site requires a much greater survey effort. Even assuming all the predicted 289 nest sites could be found (not likely), the mitigation measure would apply only to the breeding season of the survey. After the breeding season of the preconstruction survey, California would be denied the production of birds from the project site during every subsequent year. The project's impacts on birds would be permanent and of large magnitude.

Another concern is that the City does not disclose the efficacy of this measure as it has been applied at other projects. If the measure has been effective, the success of it must have been recorded in reports from other projects. Regardless, this measure should be revised to include the requirement of publicly available reporting of the methods and results of preconstruction nest surveys.

Response 2-9: The comment ... argues that the Draft IS/MND lacks information on if focused surveys for burrowing owl were conducted and the methods used to conduct any surveys for burrowing owl. The commenter also states that the Draft IS/MND and its supporting documents do not indicate if the adjacent, vacant property to the east was surveyed for burrowing owl. The commenter recommends that the Draft IS/MND is revised to include the results of four focused surveys for burrowing owl within the entire project site and surrounding area, including survey reports. Finally, the commenter provides recommended edits to Draft IS/MND Mitigation Measure BIO-3 (Burrowing Owl Preconstruction Survey). As documented in Draft IS/MND Section 4.4, *Biological Resources*, and Draft IS/MND Appendix B, a comprehensive habitat assessment and general biological survey were conducted on January 16, 2025 by three qualified biologists with extensive combined experience in burrowing owl ecology and survey protocols. The entire 77.3 gross acre project site and adjacent accessible areas were surveyed for suitable burrowing owl habitat, suitable burrows, individuals, and sign (feathers, pellets, whitewash, prey remains, etc.). The assessment found:

- No suitable burrows or burrow surrogates (i.e., ground squirrel burrows, pipes, debris piles, etc.) of sufficient size or depth to support burrowing owl were present anywhere on the project site.
- No burrowing owl individuals or sign were observed during the survey.
- The site is highly disturbed, dominated by non-native grasses and mustards, with limited native vegetation and no evidence of active or historical burrowing owl use.
- To the extent allowed, adjacent areas were visually assessed for suitable habitat and burrows with no suitable burrows or owl sign detected.
- The CDFW Staff Report on Burrowing Owl Mitigation (2012) outlines a three-step process: habitat assessment, surveys, and impact assessment. The Staff Report states, “A habitat assessment is the first step in the evaluation process and will assist investigators in determining whether or not occupancy surveys are needed.” Further, “Burrowing owl surveys are the second step of the evaluation process and the best available scientific literature recommends that they be conducted whenever burrowing owl habitat or sign is encountered on or adjacent to (within 150 meters) a project site.” Focused surveys are not warranted for the following reasons:
 - The requirement for four focused surveys is intended for sites where suitable burrowing owl habitat or sign is present, or where burrows are detected that could be used by burrowing owls. In this case, no suitable burrows, burrowing owl individuals, or sign were observed during a thorough habitat assessment.

- Conducting protocol-level focused surveys on a site lacking suitable burrows and sign would not yield meaningful data and would not improve avoidance or minimization of impacts.
- The Applicant commits to the portion of the revised mitigation measure related to preconstruction burrowing owl surveys to ensure any new colonization or creation of burrowing owl burrows between now and construction will be detected and appropriately avoided. No changes to the Draft IS/MND nor Mitigation Measure BIO-3 (Burrowing Owl Pre-construction Survey) are necessary nor required in this regard.

Rebuttal: See my rebuttal to Response 2-6.

Response 2-10: ...The commentor recommends Draft IS/MND Mitigation Measure BIO-2 (Roosting Bat Avoidance) is revised to include bat survey protocols and methods of removing palm trees in ways that minimize risk of harm to bats. The commentor's recommended edits to Mitigation Measure BIO-2 have been incorporated to page 4-21 of the Draft IS/MND and are reflected below and in Section 3.0, *Errata*, of the Final IS/MND.

This change provides a minor update, correction, or clarification and does not represent "significant new information" as defined in CEQA Guidelines Section 15088.5 and would not result in any new or substantially greater significant impacts as compared to those identified in the Draft IS/MND. The comment continues by stating that removal of palm trees that contain roosting habitat for bats can subject bats to impacts ranging from permanent loss of day roosts, including maternity roosts, to direct mortality if avoidance, minimization, and mitigation measures are not implemented. As a result, the commentor suggests an additional mitigation measure be incorporated into the Draft IS/MND to protect bats during tree removal activities. The commentor's recommended mitigation measure has been incorporated as new Mitigation Measure BIO-4 (Avoidance of Bats During Tree Removal) on page 4-22 of the Draft IS/MND and is reflected below and in Section 3.0, *Errata*, of the Final IS/MND.

This change provides a minor update, correction, or clarification and does not represent "significant new information" as defined in CEQA Guidelines Section 15088.5 and would not result in any new or substantially greater significant impacts as compared to those identified in the Draft IS/MND.

BIO-2 *Surveys for Daytime, Nighttime, Wintering (Hibernacula), and Maternity Roosting Sites for Bats. Prior to commencing project activities, a California Department of Fish and Wildlife (CDFW)- approved qualified bat biologist shall perform bat habitat/roosting surveys to determine presence of daytime, nighttime, wintering (hibernacula), and maternity roost sites. Surveys shall be conducted during favorable weather conditions only. Each survey shall consist of one dusk emergence survey (start one hour before sunset and last for three hours), followed by one predawn re-entry survey (start one hour before sunrise and last for two hours), and one daytime visual inspection of all potential roosting habitat on the project site.*

Surveys shall be conducted within one 24-hour period. Visual inspections shall focus on the identification of bat sign (i.e., individuals, guano, urine staining, corpses, feeding remains, scratch marks and bats squeaking and chattering). Bat detectors, bat call analysis, and visual observation shall be used during all dusk emergence and pre-dawn re-entry surveys. If active maternity roosts are identified in the work area or 500 feet extending from the work area, Project construction will only occur between October 1 and February 28, outside of the maternity roosting season when young bats are present but are not yet ready to fly out of the roost. Maternity roosts shall not be evicted, excluded, removed, or disturbed. If active hibernacula are identified in the work area or 500 feet extending from the work area, a minimum 500-foot no-work buffer shall be provided around hibernacula. Buffers shall be left in place until the end of project construction and activities or until a qualified bat biologist determines that the hibernacula are no longer active. Project-related construction and activities shall not occur between 30 minutes before sunset and 30 minutes after sunrise. Hibernacula roosts shall not be evicted, excluded, removed, or disturbed.

Rebuttal: Should the project go forward, I would concur with this measure. However, the conservation benefits of this measure would be *de minimis* relative to the project's impacts on bats, because the loss of roosting and foraging opportunities – the loss of habitat – would be permanent once construction is completed. Any protection of daytime, winter, or maternity roosts that are achieved by this measure would apply only to the year of construction. Every subsequent year would realize no more productivity of bats on the project site, resulting in a permanent, substantial impact to bats.

Lastly, the measure does not disclose the efficacy of this measure as it has been applied at other projects. If the measure has been effective, the success of it must have been recorded in reports from other projects. Regardless, this measure should be revised to include the requirement of publicly available reporting of the methods and results of preconstruction surveys for bat maternity roosts.

Response 2-11: The comment states that the MND lacks analysis of direct, indirect, and cumulative impacts of artificial nighttime lighting, including impacts associated with long-term operations, on biological resources including migratory birds that fly at night, burrowing owls, bats, and other nocturnal and crepuscular wildlife. As a result, the commenter suggests an additional mitigation measure be incorporated into the Draft IS/MND to minimize direct, indirect, and cumulative impacts of artificial nighttime lighting on biological resources. The Draft IS/MND includes an analysis of the project's potential to result in a new source of substantial light and glare. As noted in Draft IS/MND Section 4.1, *Aesthetics*, the project would comply with Municipal Code Chapter 9.24, *Noise Control*, which limits allowable construction hours occurring between October 1st and April 30th to the hours of 7:00 a.m. to 5:30 p.m. Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturday. Between May 1st and September 30th, construction is allowed between 5:30 a.m. and 7:00 p.m. Monday through Friday, and between 8:00 a.m. and 5:00 p.m. on Saturday. As the project does not propose nighttime construction activities in conformance with Municipal Code Chapter 9.24, short-term construction-related impacts pertaining to nighttime lighting are not anticipated. Once built, the housing development would increase lighting at the

project site compared to existing conditions; refer to Draft IS/MND Section 4.1. However, the lighting would be similar to the existing surrounding community. Further, the project would be required to comply with the exterior lighting requirements included in Municipal Code Chapter 24.16, *Outdoor Lighting Requirements*, which contains requirements to minimize the offsite illumination onto adjoining properties. Further, the project would comply with General Plan Policy 2.5, which requires the limitation of light pollution from outdoor sources. Based on the City's existing regulatory framework described in Draft IS/MND Section 4.1, the commenter's recommended mitigation measure is not necessary nor required in this regard.

Rebuttal: The response fails to address one of the main points of the CDFW's comments on lighting, and that is the CDFW's concern over the lack of analysis of potential impacts on wildlife that would be caused by the project's nighttime lighting. This concern includes cumulative impacts resulting from the nighttime lighting of existing neighborhoods around the project site. The CDFW recommends revising the IS/MND to include this analysis and to predict impacts. The response neither summarizes nor addresses this issue.

The CDFW also recommends a mitigation strategy to minimize the effects of nighttime lighting on wildlife. I concur with CDFW's recommendation. Unfortunately, the response is to reject the recommended strategy because the project's lighting would be no different from the lighting of surrounding neighborhoods. The City's reason for rejecting the recommendation is unsupported by any evidence that nighttime lighting in surrounding neighborhoods is benign to wildlife.

Response 2-12: The comment states that the Draft IS/MND lacks additional information on landscaping plans and recommends the Draft IS/MND is revised to include the Coachella Valley Native Plants Recommended for Landscaping included in Section 4.0 of the *Coachella Valley Multiple Species Habitat Conservation Plan* (CVMSHCP). The commentor also recommends incorporation of water-wise concepts including xeriscaping with locally native California species and installing water-efficient irrigation systems. As described on Page 2-4 of the Draft IS/MND, the City of Palm Desert requires for development projects to submit a conceptual landscape plan in accordance with the requirements of the Palm Desert Municipal Code Chapter 24.04, *Water- Efficient Landscape*. Planting materials would include a variety of trees and shrubs, including large accent succulents, specimen shrubs, screening shrubs, massing shrubs, cacti, groundcovers, and lawn. In addition, in accordance with Palm Desert Municipal Code Section 24.04.040, *Landscape Documentation Package*, the project's landscape plan is also required to review and approval by the Coachella Valley Water District (CVWD). No changes to the Draft IS/MND are necessary nor required in this regard.

Rebuttal: The response rejects the CDFW's recommendations on the grounds that the IS/MND had essentially already required them. I agree with CDFW's comment and recommendation. If the project goes forward, California native plant landscaping (i.e., grassland and locally appropriate scrub plants) should be required as opposed to landscaping with lawn and exotic shrubs and trees. Native plants offer more structure,

cover, food resources, and nesting substrate for wildlife than landscaping with lawn and ornamental trees. Native plant landscaping has been shown to increase the abundance of arthropods which act as important sources of food for wildlife and are crucial for pollination and plant reproduction (Narango et al. 2017, Adams et al. 2020, Smallwood and Wood 2022.). Further, many endangered and threatened insects require native host plants for reproduction and migration, e.g., monarch butterfly. Around the world, landscaping with native plants over exotic plants increases the abundance and diversity of birds, and it is particularly valuable to native birds (Lerman and Warren 2011, Burghardt et al. 2008, Berthon et al. 2021, Smallwood and Wood 2022). Landscaping with native plants is a way to maintain or to bring back some of the natural habitat and lessen the footprint of urbanization by acting as interconnected patches of habitat for wildlife (Goddard et al. 2009, Tallamy 2020). Lastly, not only does native plant landscaping benefit wildlife, but it also requires less water and maintenance than traditional landscaping with lawn and hedges.

Response 2-13: The comment states that CEQA requires that information developed for environmental impact reports and negative declarations to be incorporated into a database which may be used to make subsequent or supplemental environmental determinations and to report any special-status species and natural communities detected during project surveys to the California Natural Diversity Database (CNDDB). This comment is acknowledged. Since this comment does not identify a specific concern with the adequacy of the Draft IS/MND or raise an issue or comment specifically related to the Draft IS/MND's environmental analysis under CEQA, no further response is warranted. (CEQA Guidelines Section 15088(a) requires that a lead agency only evaluate and respond to comments raised on environmental issues.).

Rebuttal: The response relies on what the City believes to be a technicality to justify the rejection of CDFW's comment and recommendation. I agree with the CDFW that the data at issue need to be supplied to the CNDDB. Without doing so, the IS/MND's disclosure requirements fall short of one of CEQA's key objectives. See Figure 6 herein for a schematic of why it is essential to share information about impact predictions and subsequent impact measurements. Without disclosing this information, the effectiveness of CEQA can only struggle to improve, whereas disclosure of the information enables use of the comparative method for assessing impact predictions and mitigation efficacy.

FLAWED MITIGATION STRATEGY

As I commented earlier, the mitigation strategy needs to be based on a sound understanding of the existing wildlife community. It needs to be known which species occur or are likely to occur on the project site as well as the nature of their occurrences. Are the occurrences of resident species? Migratory? For special-status species, detection surveys should have been performed to either detect the species or to obtain evidence of absence. Surveys should have been performed to understand how wildlife use the site in their movement patterns. And what was found of wildlife species needs to be carefully interpreted by comparing the findings at the project site to the findings from other survey efforts at other sites. The mitigation strategy needs to follow the steps under

Assess species occurrence likelihoods and Characterize wildlife community, followed by Step 7: Predict impacts (Figure 6). The IS/MND's mitigation strategy does not derive from these steps. This pointed out, my comments follow in regular font the summary of the one required mitigation measure in italics that I did not already address in the preceding rebuttals to the City's responses to the CDFW's comments.

Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP).

The CVMSHCP requires a fee of \$1,720 per home as mitigation for covered species.

Whereas the IS/MND claims that only two of the species covered by CVMSHCP have potential for occurrence on the project site, 18 of the species in Table 2 are covered. Four of these species have been documented within 1.5 miles of the project site, and another four have been documented between 1.5 and 4 miles of the site. More importantly, regarding the potential efficacy of this measure, 128 special-status species in Table 2 are not covered by the CVMSHCP, including 10 that have been documented on or just off the site, 33 that have been documented within 1.5 miles of the site, and another 15 documented between 1.5 and 4 miles of the site. For all these special-status species, payment of the fee into the CVMSHCP is unlikely to fully mitigate project impacts. Much more compensatory mitigation is needed than paying the required CVMSHCP mitigation fee.

BIO-3 Burrowing Owl Pre-construction Survey. *Within 30 days prior to any ground disturbing activities, a burrowing owl pre-construction survey shall be conducted by a qualified biologist to determine the presence/absence of burrowing owls on the project site and within a 500-foot buffer. Walking transects will be spaced no greater than 30 meters apart to ensure 100 percent visual coverage of the survey area. The location of all burrowing owls or burrows with burrowing owl sign shall be recorded and mapped. A written report documenting the survey shall be prepared following the survey. If burrowing owl individuals or burrowing owl sign are detected during the pre-construction survey, then CDFW shall be notified to discuss appropriate avoidance measures. If avoidance is not feasible, a Burrowing Owl Mitigation and Monitoring Plan (BOMMP) shall be developed to ensure there are no direct impacts on burrowing owl. The BOMMP shall be approved by CDFW prior to project implementation.*

The burrowing owl is a candidate for listing under the California Endangered Species Act. Therefore, the applicant needs to consult with the CDFW as a first step and before the CEQA review document is certified. Furthermore, the CDFW (2012) survey guidelines need to be implemented in full, meaning that breeding-season detection surveys must be completed. BIO-3's preconstruction survey cannot stand in for breeding season detection surveys, because preconstruction surveys carry nowhere near the same detection probabilities as do breeding-season detection surveys. For these reasons, BIO-3 is flawed and deficient.

NEEDED MITIGATION MEASURES

Bird-Window Collision Mortality: If the project goes forward, it should at a minimum adhere to available Bird-Safe Guidelines, such as those prepared by American Bird Conservancy and New York and San Francisco. The American Bird Conservancy (ABC) produced an excellent set of guidelines recommending actions to: (1) Minimize use of glass; (2) Placing glass behind some type of screening (grilles, shutters, exterior shades); (3) Using glass with inherent properties to reduce collisions, such as patterns, window films, decals or tape; and (4) Turning off lights during migration seasons (Sheppard and Phillips 2015). The City of San Francisco (San Francisco Planning Department 2011) also has a set of building design guidelines, based on the excellent guidelines produced by the New York City Audubon Society (Orff et al. 2007). The ABC document and both the New York and San Francisco documents provide excellent alerting of potential bird-collision hazards as well as many visual examples. The San Francisco Planning Department's (2011) building design guidelines are more comprehensive than those of New York City, but they could have gone further. For example, the San Francisco guidelines probably should have also covered scientific monitoring of impacts as well as compensatory mitigation for impacts that could not be avoided, minimized or reduced.

New research results inform of the efficacy of marking windows. Whereas Klem (1990) found no deterrent effect from decals on windows, Johnson and Hudson (1976) reported a fatality reduction of about 69% after placing decals on windows. In an experiment of opportunity, Ocampo-Peñuela et al. (2016) found only 2 of 86 fatalities at one of 6 buildings – the only building with windows treated with a bird deterrent film. At the building with fritted glass, bird collisions were 82% lower than at other buildings with untreated windows. Kahle et al. (2016) added external window shades to some windowed façades to reduce fatalities 82% and 95%. Brown et al. (2020) reported an 84% lower collision probability among fritted glass windows and windows treated with ORNILUX R UV. City of Portland Bureau of Environmental Services and Portland Audubon (2020) reduced bird collision fatalities 94% by affixing marked Solyx window film to existing glass panels of Portland's Columbia Building. Many external and internal glass markers have been tested experimentally, some showing no effect and some showing strong deterrent effects (Klem 1989, 1990, 2009, 2011; Klem and Saenger 2013; Rössler et al. 2015).

Van Doren et al. (2021) found that nocturnal migrants contributed most of the collision fatalities in their study, and the largest predictors of fatalities were peak migration and lit windows. Van Doren et al. (2021) predicted that a light-out mitigation measure could reduce bird-window collision mortality by 60%.

Monitoring and the use of compensatory mitigation should be incorporated at any new building project because the measures recommended in the available guidelines remain of uncertain efficacy, and even if these measures are effective, they will not reduce collision fatalities to zero. The only way to assess mitigation efficacy and to quantify post-construction fatalities is to monitor the project for fatalities.

Fund Wildlife Rehabilitation Facilities: Compensatory mitigation is needed, and it ought also include funding contributions to wildlife rehabilitation facilities to cover the costs of injured animals that will be delivered to these facilities for care. Many animals would likely be injured during construction and by collisions with automobiles traveling to and from the new development, and by collisions with windows and depredation by house cats.

Thank you for your consideration,



Shawn Smallwood, Ph.D.

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Kenneth Shawn Smallwood

Curriculum Vitae

3108 Finch Street
Davis, CA 95616
Phone (530) 756-4598
Cell (530) 601-6857
puma@dcn.org

Born May 3, 1963 in
Sacramento, California.
Married, father of two.

Ecologist

Expertise

- Finding solutions to controversial problems related to wildlife interactions with human industry, infrastructure, and activities;
- Wildlife monitoring and field study using GPS, thermal imaging, behavior surveys;
- Using systems analysis and experimental design principles to identify meaningful ecological patterns that inform management decisions.

Education

Ph.D. Ecology, University of California, Davis. September 1990.
M.S. Ecology, University of California, Davis. June 1987.
B.S. Anthropology, University of California, Davis. June 1985.
Corcoran High School, Corcoran, California. June 1981.

Experience

- 762 professional reports, including:
 - 90 peer reviewed publications
 - 24 in non-reviewed proceedings
- 646 reports, declarations, posters and book reviews
- 8 in mass media outlets
- 92 public presentations of research results

Editing for scientific journals: Guest Editor, *Wildlife Society Bulletin*, 2012-2013, of invited papers representing international views on the impacts of wind energy on wildlife and how to mitigate the impacts. Associate Editor, *Journal of Wildlife Management*, March 2004 to 30 June 2007. Editorial Board Member, *Environmental Management*, 10/1999 to 8/2004. Associate Editor, *Biological Conservation*, 9/1994 to 9/1995.

Member, Alameda County Scientific Review Committee (SRC), August 2006 to April 2011. The five-member committee investigated causes of bird and bat collisions in the Altamont Pass Wind Resource Area, and recommended mitigation and monitoring measures. The SRC reviewed the science underlying the Alameda County Avian Protection Program, and advised

the County on how to reduce wildlife fatalities.

Consulting Ecologist, 2004-2007, California Energy Commission (CEC). Provided consulting services as needed to the CEC on renewable energy impacts, monitoring and research, and produced several reports. Also collaborated with Lawrence-Livermore National Lab on research to understand and reduce wind turbine impacts on wildlife.

Consulting Ecologist, 1999-2013, U.S. Navy. Performed endangered species surveys, hazardous waste site monitoring, and habitat restoration for the endangered San Joaquin kangaroo rat, California tiger salamander, California red-legged frog, California clapper rail, western burrowing owl, salt marsh harvest mouse, and other species at Naval Air Station Lemoore; Naval Weapons Station, Seal Beach, Detachment Concord; Naval Security Group Activity, Skaggs Island; National Radio Transmitter Facility, Dixon; and, Naval Outlying Landing Field Imperial Beach.

Part-time Lecturer, 1998-2005, California State University, Sacramento. Instructed Mammalogy, Behavioral Ecology, and Ornithology Lab, Contemporary Environmental Issues, Natural Resources Conservation.

Senior Ecologist, 1999-2005, BioResource Consultants. Designed and implemented research and monitoring studies related to avian fatalities at wind turbines, avian electrocutions on electric distribution poles across California, and avian fatalities at transmission lines.

Chairman, Conservation Affairs Committee, The Wildlife Society--Western Section, 1999-2001. Prepared position statements and led efforts directed toward conservation issues, including travel to Washington, D.C. to lobby Congress for more wildlife conservation funding.

Systems Ecologist, 1995-2000, Institute for Sustainable Development. Headed ISD's program on integrated resources management. Developed indicators of ecological integrity for large areas, using remotely sensed data, local community involvement and GIS.

Associate, 1997-1998, Department of Agronomy and Range Science, University of California, Davis. Worked with Shu Geng and Mingua Zhang on several studies related to wildlife interactions with agriculture and patterns of fertilizer and pesticide residues in groundwater across a large landscape.

Lead Scientist, 1996-1999, National Endangered Species Network. Informed academic scientists and environmental activists about emerging issues regarding the Endangered Species Act and other environmental laws. Testified at public hearings on endangered species issues.

Ecologist, 1997-1998, Western Foundation of Vertebrate Zoology. Conducted field research to determine the impact of past mercury mining on the status of California red-legged frogs in Santa Clara County, California.

Senior Systems Ecologist, 1994-1995, EIP Associates, Sacramento, California. Provided consulting services in environmental planning, and quantitative assessment of land units for their conservation and restoration opportunities based on ecological resource requirements of 29 special-status species. Developed ecological indicators for prioritizing areas within Yolo County

to receive mitigation funds for habitat easements and restoration.

Post-Graduate Researcher, 1990-1994, Department of Agronomy and Range Science, *U.C. Davis*. Under Dr. Shu Geng's mentorship, studied landscape and management effects on temporal and spatial patterns of abundance among pocket gophers and species of Falconiformes and Carnivora in the Sacramento Valley. Managed and analyzed a data base of energy use in California agriculture. Assisted with landscape (GIS) study of groundwater contamination across Tulare County, California.

Work experience in graduate school: Co-taught Conservation Biology with Dr. Christine Schonewald, 1991 & 1993, UC Davis Graduate Group in Ecology; Reader for Dr. Richard Coss's course on Psychobiology in 1990, UC Davis Department of Psychology; Research Assistant to Dr. Walter E. Howard, 1988-1990, UC Davis Department of Wildlife and Fisheries Biology, testing durable baits for pocket gopher management in forest clearcuts; Research Assistant to Dr. Terrell P. Salmon, 1987-1988, UC Wildlife Extension, Department of Wildlife and Fisheries Biology, developing empirical models of mammal and bird invasions in North America, and a rating system for priority research and control of exotic species based on economic, environmental and human health hazards in California. Student Assistant to Dr. E. Lee Fitzhugh, 1985-1987, UC Cooperative Extension, Department of Wildlife and Fisheries Biology, developing and implementing statewide mountain lion track count for long-term monitoring.

Fulbright Research Fellow, Indonesia, 1988. Tested use of new sampling methods for numerical monitoring of Sumatran tiger and six other species of endemic felids, and evaluated methods used by other researchers.

Projects

Repowering wind energy projects through careful siting of new wind turbines using map-based collision hazard models to minimize impacts to volant wildlife. Funded by wind companies (principally NextEra Renewable Energy, Inc.), California Energy Commission and East Bay Regional Park District, I have collaborated with a GIS analyst and managed a crew of five field biologists performing golden eagle behavior surveys and nocturnal surveys on bats and owls. The goal is to quantify flight patterns for development of predictive models to more carefully site new wind turbines in repowering projects. Focused behavior surveys began May 2012 and continue. Collision hazard models have been prepared for seven wind projects, three of which were built. Planning for additional repowering projects is underway.

Test avian safety of new mixer-ejector wind turbine (MEWT). Designed and implemented a before-after, control-impact experimental design to test the avian safety of a new, shrouded wind turbine developed by Ogin Inc. (formerly known as FloDesign Wind Turbine Corporation). Supported by a \$718,000 grant from the California Energy Commission's Public Interest Energy Research program and a 20% match share contribution from Ogin, I managed a crew of seven field biologists who performed periodic fatality searches and behavior surveys, carcass detection trials, nocturnal behavior surveys using a thermal camera, and spatial analyses with the collaboration of a GIS analyst. Field work began 1 April 2012 and ended 30 March 2015 without Ogin installing its MEWTs, but we still achieved multiple important scientific advances.

Reduce avian mortality due to wind turbines at Altamont Pass. Studied wildlife impacts caused by 5,400 wind turbines at the world's most notorious wind resource area. Studied how impacts are perceived by monitoring and how they are affected by terrain, wind patterns, food resources, range management practices, wind turbine operations, seasonal patterns, population cycles, infrastructure management such as electric distribution, animal behavior and social interactions.

Reduce avian mortality on electric distribution poles. Directed research toward reducing bird electrocutions on electric distribution poles, 2000-2007. Oversaw 5 founts of fatality searches at 10,000 poles from Orange County to Glenn County, California, and produced two large reports.

Cook *et al.* v. Rockwell International *et al.*, No. 90-K-181 (D. Colorado). Provided expert testimony on the role of burrowing animals in affecting the fate of buried and surface-deposited radioactive and hazardous chemical wastes at the Rocky Flats Plant, Colorado. Provided expert reports based on four site visits and an extensive document review of burrowing animals. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals. I testified in federal court in November 2005, and my clients were subsequently awarded a \$553,000,000 judgment by a jury. After appeals the award was increased to two billion dollars.

Hanford Nuclear Reservation Litigation. Provided expert testimony on the role of burrowing animals in affecting the fate of buried radioactive wastes at the Hanford Nuclear Reservation, Washington. Provided three expert reports based on three site visits and extensive document review. Predicted and verified a certain population density of pocket gophers on buried waste structures, as well as incidence of radionuclide contamination in body tissue. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals.

Expert testimony and declarations on proposed residential and commercial developments, gas-fired power plants, wind, solar and geothermal projects, water transfers and water transfer delivery systems, endangered species recovery plans, Habitat Conservation Plans and Natural Communities Conservation Programs. Testified before multiple government agencies, Tribunals, Boards of Supervisors and City Councils, and participated with press conferences and depositions. Prepared expert witness reports and court declarations, which are summarized under Reports (below).

Protocol-level surveys for special-status species. Used California Department of Fish and Wildlife and US Fish and Wildlife Service protocols to search for California red-legged frog, California tiger salamander, arroyo southwestern toad, blunt-nosed leopard lizard, western pond turtle, giant kangaroo rat, San Joaquin kangaroo rat, San Joaquin kit fox, western burrowing owl, Swainson's hawk, Valley elderberry longhorn beetle and other special-status species.

Conservation of San Joaquin kangaroo rat. Performed research to identify factors responsible for the decline of this endangered species at Lemoore Naval Air Station, 2000-2013, and implemented habitat enhancements designed to reverse the trend and expand the population.

Impact of West Nile Virus on yellow-billed magpies. Funded by Sacramento-Yolo Mosquito and Vector Control District, 2005-2008, compared survey results pre- and post-West Nile Virus epidemic for multiple bird species in the Sacramento Valley, particularly on yellow-billed magpie and American crow due to susceptibility to WNV.

Workshops on HCPs. Assisted Dr. Michael Morrison with organizing and conducting a 2-day workshop on Habitat Conservation Plans, sponsored by Southern California Edison, and another 1-day workshop sponsored by PG&E. These Workshops were attended by academics, attorneys, and consultants with HCP experience. We guest-edited a Proceedings published in Environmental Management.

Mapping of biological resources along Highways 101, 46 and 41. Used GPS and GIS to delineate vegetation complexes and locations of special-status species along 26 miles of highway in San Luis Obispo County, 14 miles of highway and roadway in Monterey County, and in a large area north of Fresno, including within reclaimed gravel mining pits.

GPS mapping and monitoring at restoration sites and at Caltrans mitigation sites. Monitored the success of elderberry shrubs at one location, the success of willows at another location, and the response of wildlife to the succession of vegetation at both sites. Also used GPS to monitor the response of fossorial animals to yellow star-thistle eradication and natural grassland restoration efforts at Bear Valley in Colusa County and at the decommissioned Mather Air Force Base in Sacramento County.

Mercury effects on Red-legged Frog. Assisted Dr. Michael Morrison and US Fish and Wildlife Service in assessing the possible impacts of historical mercury mining on the federally listed California red-legged frog in Santa Clara County. Also measured habitat variables in streams.

Opposition to proposed No Surprises rule. Wrote a white paper and summary letter explaining scientific grounds for opposing the incidental take permit (ITP) rules providing ITP applicants and holders with general assurances they will be free of compliance with the Endangered Species Act once they adhere to the terms of a “properly functioning HCP.” Submitted 188 signatures of scientists and environmental professionals concerned about No Surprises rule US Fish and Wildlife Service, National Marine Fisheries Service, all US Senators.

Natomas Basin Habitat Conservation Plan alternative. Designed narrow channel marsh to increase the likelihood of survival and recovery in the wild of giant garter snake, Swainson’s hawk and Valley Elderberry Longhorn Beetle. The design included replication and interspersions of treatments for experimental testing of critical habitat elements. I provided a report to Northern Territories, Inc.

Assessments of agricultural production system and environmental technology transfer to China. Twice visited China and interviewed scientists, industrialists, agriculturalists, and the Directors of the Chinese Environmental Protection Agency and the Department of Agriculture to assess the need and possible pathways for environmental clean-up technologies and trade opportunities between the US and China.

Yolo County Habitat Conservation Plan. Conducted landscape ecology study of Yolo County to spatially prioritize allocation of mitigation efforts to improve ecosystem functionality within the County from the perspective of 29 special-status species of wildlife and plants. Used a hierarchically structured indicators approach to apply principles of landscape and ecosystem ecology, conservation biology, and local values in rating land units. Derived GIS maps to help guide the conservation area design, and then developed implementation strategies.

Mountain lion track count. Developed and conducted a carnivore monitoring program throughout California since 1985. Species counted include mountain lion, bobcat, black bear, coyote, red and gray fox, raccoon, striped skunk, badger, and black-tailed deer. Vegetation and land use are also monitored. Track survey transect was established on dusty, dirt roads within randomly selected quadrats.

Sumatran tiger and other felids. Upon award of Fulbright Research Fellowship, I designed and initiated track counts for seven species of wild cats in Sumatra, including Sumatran tiger, fishing cat, and golden cat. Spent four months on Sumatra and Java in 1988, and learned Bahasa Indonesia, the official Indonesian language.

Wildlife in agriculture. Beginning as post-graduate research, I studied pocket gophers and other wildlife in 40 alfalfa fields throughout the Sacramento Valley, and I surveyed for wildlife along a 200 mile road transect since 1989 with a hiatus of 1996-2004. The data are analyzed using GIS and methods from landscape ecology, and the results published and presented orally to farming groups in California and elsewhere. I also conducted the first study of wildlife in cover crops used on vineyards and orchards.

Agricultural energy use and Tulare County groundwater study. Developed and analyzed a data base of energy use in California agriculture, and collaborated on a landscape (GIS) study of groundwater contamination across Tulare County, California.

Pocket gopher damage in forest clear-cuts. Developed gopher sampling methods and tested various poison baits and baiting regimes in the largest-ever field study of pocket gopher management in forest plantations, involving 68 research plots in 55 clear-cuts among 6 National Forests in northern California.

Risk assessment of exotic species in North America. Developed empirical models of mammal and bird species invasions in North America, as well as a rating system for assigning priority research and control to exotic species in California, based on economic, environmental, and human health hazards.

Peer Reviewed Publications

Smallwood, K. S. 2022. Utility-scale solar impacts to volant wildlife. *Journal of Wildlife Management*: e22216. <https://doi.org/10.1002/jwmg.22216>

Smallwood, K. S., and N. L. Smallwood. 2021. Breeding Density and Collision Mortality of Loggerhead Shrike (*Lanius ludovicianus*) in the Altamont Pass Wind Resource Area. *Diversity* 13, 540. <https://doi.org/10.3390/d13110540>.

Smallwood, K. S. 2020. USA wind energy-caused bat fatalities increase with shorter fatality search intervals. *Diversity* 12(98); <https://doi.org/10.3390/d12030098>

Smallwood, K. S., D. A. Bell, and S. Standish. 2020. Dogs detect larger wind energy impacts on bats and birds. *Journal of Wildlife Management* 84:852-864. DOI: 10.1002/jwmg.21863.

Smallwood, K. S., and D. A. Bell. 2020. Relating bat passage rates to wind turbine fatalities.

- Diversity 12(84); doi:10.3390/d12020084.
- Smallwood, K. S., and D. A. Bell. 2020. Effects of wind turbine curtailment on bird and bat fatalities. *Journal of Wildlife Management* 84:684-696. DOI: 10.1002/jwmg.21844
- Kitano, M., M. Ino, K. S. Smallwood, and S. Shiraki. 2020. Seasonal difference in carcass persistence rates at wind farms with snow, Hokkaido, Japan. *Ornithological Science* 19: 63 – 71.
- Smallwood, K. S. and M. L. Morrison. 2018. Nest-site selection in a high-density colony of burrowing owls. *Journal of Raptor Research* 52:454-470.
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- Smallwood, K. S. 2017. Long search intervals under-estimate bird and bat fatalities caused by wind turbines. *Wildlife Society Bulletin* 41:224-230.
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EXHIBIT C



INDOOR ENVIRONMENTAL ENGINEERING



1448 Pine Street, Suite 103 San Francisco, California 94109

Telephone: (415) 567-7700

E-mail: offer mann@IEE-SF.com

<http://www.iee-sf.com>

Date: November 17, 2025

To: Richard Drury
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
Oakland, California 94612

From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: Catavina Residential Development Project, Palm Desert, CA. (IEE File Reference: P-4910)

Pages: 18

Indoor Air Quality Impacts

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings relative to outdoor air because many of the materials and products used indoors contain and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson,

2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

Indoor Formaldehyde Concentrations Impact. In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 $\mu\text{g}/\text{day}$. The NSRL concentration of formaldehyde that represents a daily dose of 40 μg is 2 $\mu\text{g}/\text{m}^3$, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m^3 , and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 $\mu\text{g}/\text{m}^3$. The median indoor formaldehyde concentration was 36 $\mu\text{g}/\text{m}^3$, and ranged from 4.8 to 136 $\mu\text{g}/\text{m}^3$, which corresponds to a median exceedance of the 2 $\mu\text{g}/\text{m}^3$ NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 $\mu\text{g}/\text{m}^3$, is 180 per million as a result of formaldehyde alone. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the South Coast Air Quality Management District.

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017b). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 $\mu\text{g}/\text{m}^3$ to 28% for the Acute REL of 55 $\mu\text{g}/\text{m}^3$.

The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particleboard. These materials are commonly used in building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Singer et. al., 2019) and found that the median indoor formaldehyde in new homes built after 2009 with CARB Phase 2 Formaldehyde ATCM materials had lower indoor formaldehyde concentrations, with a median indoor concentrations of $22.4 \mu\text{g}/\text{m}^3$ (18.2 ppb) as compared to a median of $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS. Unlike in the CNHS study where formaldehyde concentrations were measured with pumped DNPH samplers, the formaldehyde concentrations in the HENGH study were measured with passive samplers, which were estimated to under-measure the true indoor formaldehyde concentrations by approximately 7.5%. Applying this correction to the HENGH indoor formaldehyde concentrations results in a median indoor concentration of $24.1 \mu\text{g}/\text{m}^3$, which is 33% lower than the $36 \mu\text{g}/\text{m}^3$ found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 33% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 120 per million for homes built with CARB compliant composite wood products. This median lifetime cancer risk is more than 12 times the OEHHA 10 in a million cancer risk threshold (OEHHA, 2017a).

With respect to the Catavina Residential Development Project, Palm Desert, CA, the buildings consist of residential spaces.

The residential occupants will potentially have continuous exposure (e.g. 24 hours per day, 52 weeks per year). These exposures are anticipated to result in significant cancer risks

resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residential construction.

Because these residences will be constructed with CARB Phase 2 Formaldehyde ATCM materials and be ventilated with the minimum code required amount of outdoor air, the indoor residential formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of 24.1 $\mu\text{g}/\text{m}^3$ (Singer et. al., 2020)

Assuming that the residential occupants inhale 20 m^3 of air per day, the average 70-year lifetime formaldehyde daily dose is 482 $\mu\text{g}/\text{day}$ for continuous exposure in the residences. This exposure represents a cancer risk of 120 per million, which is more than 12 times the CEQA cancer risk of 10 per million. For occupants that do not have continuous exposure, the cancer risk will be proportionally less but still substantially over the CEQA cancer risk of 10 per million (e.g. for 12/hour/day occupancy, more than 6 times the CEQA cancer risk of 10 per million).

In addition, we note that the average outdoor air concentration of formaldehyde in California is 3 ppb, or 3.7 $\mu\text{g}/\text{m}^3$, (California Air Resources Board, 2004), and thus represents an average pre-existing background airborne cancer risk of 1.85 per million. Thus, the indoor air formaldehyde exposures describe above exacerbate this pre-existing risk resulting from outdoor air formaldehyde exposures.

Additionally, the SCAQMD's Multiple Air Toxics Exposure Study ("MATES V") identifies an existing cancer risk at the Project site of 238 per million due to the site's elevated ambient air contaminant concentrations, which are due to the area's high levels of vehicle traffic. These impacts would further exacerbate the pre-existing cancer risk to the building occupants, which result from exposure to formaldehyde in both indoor and outdoor air.

Appendix A, Indoor Formaldehyde Concentrations and the CARB Formaldehyde ATCM, provides analyses that show utilization of CARB Phase 2 Formaldehyde ATCM materials will not ensure acceptable cancer risks with respect to formaldehyde emissions from

composite wood products.

Even composite wood products manufactured with CARB certified ultra-low emitting formaldehyde (ULEF) resins do not ensure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can ensure that the OEHHA cancer risk of 10 per million is met.

The following describes a method that should be used, prior to construction in the environmental review under CEQA, for determining whether the indoor concentrations resulting from the formaldehyde emissions of specific building materials/furnishings selected exceed cancer and non-cancer guidelines. Such a design analyses can be used to identify those materials/furnishings prior to the completion of the City's CEQA review and project approval, that have formaldehyde emission rates that contribute to indoor concentrations that exceed cancer and non-cancer guidelines, so that alternative lower emitting materials/furnishings may be selected and/or higher minimum outdoor air ventilation rates can be increased to achieve acceptable indoor concentrations and incorporated as mitigation measures for this project.

Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment

This formaldehyde emissions assessment should be used in the environmental review under CEQA to assess the indoor formaldehyde concentrations from the proposed loading of building materials/furnishings, the area-specific formaldehyde emission rate data for building materials/furnishings, and the design minimum outdoor air ventilation rates. This assessment allows the applicant (and the City) to determine, before the conclusion of the environmental review process and the building materials/furnishings are specified, purchased, and installed, if the total chemical emissions will exceed cancer and non-cancer guidelines, and if so, allow for changes in the selection of specific material/furnishings and/or the design minimum outdoor air ventilations rates such that cancer and non-cancer guidelines are not exceeded.

1.) Define Indoor Air Quality Zones. Divide the building into separate indoor air quality zones, (IAQ Zones). IAQ Zones are defined as areas of well-mixed air. Thus, each ventilation system with recirculating air is considered a single zone, and each room or group of rooms where air is not recirculated (e.g. 100% outdoor air) is considered a separate zone. For IAQ Zones with the same construction material/furnishings and design minimum outdoor air ventilation rates. (e.g. hotel rooms, apartments, condominiums, etc.) the formaldehyde emission rates need only be assessed for a single IAQ Zone of that type.

2.) Calculate Material/Furnishing Loading. For each IAQ Zone, determine the building material and furnishing loadings (e.g., m² of material/m² floor area, units of furnishings/m² floor area) from an inventory of all potential indoor formaldehyde sources, including flooring, ceiling tiles, furnishings, finishes, insulation, sealants, adhesives, and any products constructed with composite wood products containing urea-formaldehyde resins (e.g., plywood, medium density fiberboard, particleboard).

3.) Calculate the Formaldehyde Emission Rate. For each building material, calculate the formaldehyde emission rate (µg/h) from the product of the area-specific formaldehyde emission rate (µg/m²-h) and the area (m²) of material in the IAQ Zone, and from each furnishing (e.g. chairs, desks, etc.) from the unit-specific formaldehyde emission rate (µg/unit-h) and the number of units in the IAQ Zone.

NOTE: As a result of the high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014), most manufacturers of building materials furnishings sold in the United States conduct chemical emission rate tests using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), or other equivalent chemical emission rate testing methods. Most manufacturers of building furnishings sold in the United States conduct chemical emission rate tests using ANSI/BIFMA M7.1 Standard Test Method for Determining VOC Emissions (BIFMA, 2018), or other equivalent chemical emission rate testing methods.

CDPH, BIFMA, and other chemical emission rate testing programs, typically certify that a material or furnishing does not create indoor chemical concentrations in excess of the maximum concentrations permitted by their certification. For instance, the CDPH emission rate testing requires that the measured emission rates when input into an office, school, or residential model do not exceed one-half of the OEHHA Chronic Exposure Guidelines (OEHHA, 2017b) for the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017). These certifications themselves do not provide the actual area-specific formaldehyde emission rate (i.e., $\mu\text{g}/\text{m}^2\text{-h}$) of the product, but rather provide data that the formaldehyde emission rates do not exceed the maximum rate allowed for the certification. Thus, for example, the data for a certification of a specific type of flooring may be used to calculate that the area-specific emission rate of formaldehyde is less than $31 \mu\text{g}/\text{m}^2\text{-h}$, but not the actual measured specific emission rate, which may be 3, 18, or $30 \mu\text{g}/\text{m}^2\text{-h}$. These area-specific emission rates determined from the product certifications of CDPH, BIFA, and other certification programs can be used as an initial estimate of the formaldehyde emission rate.

If the actual area-specific emission rates of a building material or furnishing is needed (i.e. the initial emission rates estimates from the product certifications are higher than desired), then that data can be acquired by requesting from the manufacturer the complete chemical emission rate test report. For instance if the complete CDPH emission test report is requested for a CDHP certified product, that report will provide the actual area-specific emission rates for not only the 35 specific VOCs, including formaldehyde, listed in Table 4-1 of the CDPH test method (CDPH, 2017), but also all of the cancer and reproductive/developmental chemicals listed in the California Proposition 65 Safe Harbor Levels (OEHHA, 2017a), all of the toxic air contaminants (TACs) in the California Air Resources Board Toxic Air Contamination List (CARB, 2011), and the 10 chemicals with the greatest emission rates.

Alternatively, a sample of the building material or furnishing can be submitted to a chemical emission rate testing laboratory, such as Berkeley Analytical Laboratory (<https://berkeleyanalytical.com>), to measure the formaldehyde emission rate.

4.) Calculate the Total Formaldehyde Emission Rate. For each IAQ Zone, calculate the

total formaldehyde emission rate (i.e. $\mu\text{g/h}$) from the individual formaldehyde emission rates from each of the building material/furnishings as determined in Step 3.

5.) Calculate the Indoor Formaldehyde Concentration. For each IAQ Zone, calculate the indoor formaldehyde concentration ($\mu\text{g/m}^3$) from Equation 1 by dividing the total formaldehyde emission rates (i.e. $\mu\text{g/h}$) as determined in Step 4, by the design minimum outdoor air ventilation rate (m^3/h) for the IAQ Zone.

$$C_{in} = \frac{E_{total}}{Q_{oa}} \quad (\text{Equation 1})$$

where:

C_{in} = indoor formaldehyde concentration ($\mu\text{g/m}^3$)

E_{total} = total formaldehyde emission rate ($\mu\text{g/h}$) into the IAQ Zone.

Q_{oa} = design minimum outdoor air ventilation rate to the IAQ Zone (m^3/h)

The above Equation 1 is based upon mass balance theory, and is referenced in Section 3.10.2 “Calculation of Estimated Building Concentrations” of the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017).

6.) Calculate the Indoor Exposure Cancer and Non-Cancer Health Risks. For each IAQ Zone, calculate the cancer and non-cancer health risks from the indoor formaldehyde concentrations determined in Step 5 and as described in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015).

7.) Mitigate Indoor Formaldehyde Exposures of exceeding the CEQA Cancer and/or Non-Cancer Health Risks. In each IAQ Zone, provide mitigation for any formaldehyde exposure risk as determined in Step 6, that exceeds the CEQA cancer risk of 10 per million or the CEQA non-cancer Hazard Quotient of 1.0.

Provide the source and/or ventilation mitigation required in all IAQ Zones to reduce the health risks of the chemical exposures below the CEQA cancer and non-cancer health risks.

Source mitigation for formaldehyde may include:

- 1.) reducing the amount materials and/or furnishings that emit formaldehyde
- 2.) substituting a different material with a lower area-specific emission rate of formaldehyde

Ventilation mitigation for formaldehyde emitted from building materials and/or furnishings may include:

- 1.) increasing the design minimum outdoor air ventilation rate to the IAQ Zone.

NOTE: Mitigating the formaldehyde emissions through use of less material/furnishings, or use of lower emitting materials/furnishings, is the preferred mitigation option, as mitigation with increased outdoor air ventilation increases initial and operating costs associated with the heating/cooling systems.

Further, we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers,” (CDPH, 2017), and use the procedure described earlier above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Impact. Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test

Day, and 15% of the homes did not use their windows during the entire preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 air changes per hour (ach), with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

The Catavina Residential Development Project, Palm Desert, CA is close to roads with moderate to high traffic (e.g., Frank Sinatra Drive, Portola Avenue, Desert Greens Drive East etc.). Thus, the Project is located in a sound impacted area.

The Draft Initial Study - Catavina Residential Development Project, Palm Desert, CA (Michael Baker International 2025) states in Table 4.13-3 that there were just three short-term 10-minute sound measurements conducted on Monday, January 20, 2025 between 10:14 and 10:56 AM, and the sound levels ranged from a minimum of 33.9 dBA to a maximum of 79.1 dBA.

In order to design the building for this Project such that interior noise levels are acceptable, an acoustic study with actual on-site measurements of the existing ambient noise levels and modeled future ambient noise levels needs to be conducted. The acoustic study of the existing ambient noise levels should be conducted over a minimum of a one-week period and report the dBA CNEL or Ldn. This study will allow for the selection of a building envelope and windows with a sufficient STC such that the indoor noise levels are acceptable. A mechanical supply of outdoor air ventilation to allow for a habitable interior environment with closed windows and doors will also be required. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within building interiors.

PM_{2.5} Outdoor Concentrations Impact. An additional impact of the nearby motor vehicle traffic associated with this project, are the outdoor concentrations of PM_{2.5}. According to

the Draft Initial Study - Catavina Residential Development Project, Palm Desert, CA (Michael Baker International 2025) the Project is located in the South Coast Air Basin, which is a State and Federal non-attainment area for PM_{2.5}.

Additionally, the SCAQMD's MATES V study cites an existing cancer risk of 238 per million at the Project site due to the site's high concentration of ambient air contaminants resulting from the area's high levels of motor vehicle traffic.

An air quality analyses should be conducted to determine the concentrations of PM_{2.5} in the outdoor and indoor air that people inhale each day. This air quality analyses needs to consider the cumulative impacts of the project related emissions, existing and projected future emissions from local PM_{2.5} sources (e.g. stationary sources, motor vehicles, and airport traffic) upon the outdoor air concentrations at the Project site. If the outdoor concentrations are determined to exceed the California and National annual average PM_{2.5} exceedence concentration of 12 µg/m³, or the National 24-hour average exceedence concentration of 35 µg/m³, then the buildings need to have a mechanical supply of outdoor air that has air filtration with sufficient removal efficiency, such that the indoor concentrations of outdoor PM_{2.5} particles is less than the California and National PM_{2.5} annual and 24-hour standards.

It is my experience that based on the projected high traffic noise levels, the annual average concentration of PM_{2.5} will exceed the California and National PM_{2.5} annual and 24-hour standards and warrant installation of high efficiency air filters (i.e. at least MERV 13, or possibly MERV 14 or 15 depending on the results of the Project ambient PM_{2.5} concentrations) in all mechanically supplied outdoor air ventilation systems.

Indoor Air Quality Impact Mitigation Measures

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish

systems that are made with CARB approved no-added formaldehyde (NAF) resins (CARB, 2009). CARB Phase 2 certified composite wood products, or ultra-low emitting formaldehyde (ULEF) resins, do not ensure indoor formaldehyde concentrations that are below the CEQA cancer risk of 10 per million. Only composite wood products manufactured with CARB approved no-added formaldehyde (NAF) resins, such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can ensure that the OEHHA cancer risk of 10 per million is met.

Alternatively, conduct the previously described Pre-Construction Building Material/Furnishing Chemical Emissions Assessment, to determine that the combination of formaldehyde emissions from building materials and furnishings do not create indoor formaldehyde concentrations that exceed the CEQA cancer and non-cancer health risks.

It is important to note that we are not asking that the builder “speculate” on what and how much composite materials be used, but rather at the design stage to select composite wood materials based on the formaldehyde emission rates that manufacturers routinely conduct using the California Department of Health “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers”, (CDPH, 2017), and use the procedure described above (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to insure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Outdoor Air Ventilation Mitigation. Provide each habitable room with a continuous mechanical supply of outdoor air that meets or exceeds the California 2016 Building Energy Efficiency Standards (California Energy Commission, 2015) requirements of the greater of 15 cfm/occupant or 0.15 cfm/ft² of floor area. Following installation of the system conduct testing and balancing to insure that required amount of outdoor air is entering each habitable room and provide a written report documenting the outdoor airflow rates. Do not use exhaust only mechanical outdoor air systems, use only balanced outdoor air supply and exhaust systems or outdoor air supply only systems. Provide a manual for the occupants or

maintenance personnel, that describes the purpose of the mechanical outdoor air system and the operation and maintenance requirements of the system.

PM_{2.5} Outdoor Air Concentration Mitigation. Install air filtration with sufficient PM_{2.5} removal efficiency (e.g. MERV 13 or higher) to filter the outdoor air entering the mechanical outdoor air supply systems, such that the indoor concentrations of outdoor PM_{2.5} particles are less than the California and National PM_{2.5} annual and 24-hour standards. Install the air filters in the system such that they are accessible for replacement by the occupants or maintenance personnel. Include in the mechanical outdoor air ventilation system manual instructions on how to replace the air filters and the estimated frequency of replacement.

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APPENDIX A

INDOOR FORMALDEHYDE CONCENTRATIONS AND THE CARB FORMALDEHYDE ATCM

With respect to formaldehyde emissions from composite wood products, the CARB ATCM regulations of formaldehyde emissions from composite wood products, do not assure healthful indoor air quality. The following is the stated purpose of the CARB ATCM regulation - *The purpose of this airborne toxic control measure is to “reduce formaldehyde emissions from composite wood products, and finished goods that contain composite wood products, that are sold, offered for sale, supplied, used, or manufactured for sale in California”*. In other words, the CARB ATCM regulations do not “assure healthful indoor air quality”, but rather “reduce formaldehyde emissions from composite wood products”.

Just how much protection do the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products? Definitely some, but certainly the regulations do not “*assure healthful indoor air quality*” when CARB Phase 2 products are utilized. As shown in the Singer et. al., 2020 study of new California homes, the median indoor formaldehyde concentration was of $22.3 \mu\text{g}/\text{m}^3$ (18.2 ppb), which corresponds to a cancer risk of 112 per million for occupants with continuous exposure, which is more than 11 times the CEQA cancer risk of 10 per million.

Another way of looking at how much protection the CARB ATCM regulations provide building occupants from the formaldehyde emissions generated by composite wood products is to calculate the maximum number of square feet of composite wood product that can be in a residence without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy.

For this calculation I utilized the floor area (2,272 ft^2), the ceiling height (8.5 ft), and the number of bedrooms (4) as defined in Appendix B (New Single-Family Residence Scenario) of the Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions for Indoor Sources Using Environmental Chambers, Version 1.1, 2017, California Department of Public Health,

For the outdoor air ventilation rate I used the 2019 Title 24 code required mechanical ventilation rate (ASHRAE 62.2) of 106 cfm (180 m³/h) calculated for this model residence. For the composite wood formaldehyde emission rates, I used the CARB ATCM Phase 2 rates.

The calculated maximum number of square feet of composite wood product that can be in a residence, without exceeding the CEQA cancer risk of 10 per million for occupants with continuous occupancy are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 15 ft² (0.7% of the floor area), or
Particle Board – 30 ft² (1.3% of the floor area), or
Hardwood Plywood – 54 ft² (2.4% of the floor area), or
Thin MDF – 46 ft² (2.0 % of the floor area).

For offices and hotels the calculated maximum amount of composite wood product (% of floor area) that can be used without exceeding the CEQA cancer risk of 10 per million for occupants, assuming 8 hours/day occupancy, and the California Mechanical Code minimum outdoor air ventilation rates are as follows for the different types of regulated composite wood products.

Medium Density Fiberboard (MDF) – 3.6 % (offices) and 4.6% (hotel rooms), or
Particle Board – 7.2 % (offices) and 9.4% (hotel rooms), or
Hardwood Plywood – 13 % (offices) and 17% (hotel rooms), or
Thin MDF – 11 % (offices) and 14 % (hotel rooms)

Clearly the CARB ATCM does not regulate the formaldehyde emissions from composite wood products such that the potentially large areas of these products, such as for flooring, baseboards, interior doors, window and door trims, and kitchen and bathroom cabinetry, could be used without causing indoor formaldehyde concentrations that result in CEQA

cancer risks that substantially exceed 10 per million for occupants with continuous occupancy.

Even composite wood products manufactured with CARB certified ultra-low emitting formaldehyde (ULEF) resins do not ensure that the indoor air will have concentrations of formaldehyde that meet the OEHHA cancer risks that substantially exceed 10 per million. The permissible emission rates for ULEF composite wood products are only 11-15% lower than the CARB Phase 2 emission rates. Only use of composite wood products made with no-added formaldehyde resins (NAF), such as resins made from soy, polyvinyl acetate, or methylene diisocyanate can ensure that the OEHHA cancer risk of 10 per million is met.

If CARB Phase 2 compliant or ULEF composite wood products are utilized in construction, then the resulting indoor formaldehyde concentrations should be determined in the design phase using the specific amounts of each type of composite wood product, the specific formaldehyde emission rates, and the volume and outdoor air ventilation rates of the indoor spaces, and all feasible mitigation measures employed to reduce this impact (e.g. use less formaldehyde containing composite wood products and/or incorporate mechanical systems capable of higher outdoor air ventilation rates). See the procedure described earlier (i.e. Pre-Construction Building Material/Furnishing Formaldehyde Emissions Assessment) to ensure that the materials selected achieve acceptable cancer risks from material off gassing of formaldehyde.

Alternatively, and perhaps a simpler approach, is to use only composite wood products (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins.

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Francis (Bud) J. Offermann PE CIH

President: Indoor Environmental Engineering,
San Francisco, CA. December, 1981 - present.
e-mail: offermann@iee-sf.com

Education

- M.S. Mechanical Engineering Stanford University, Stanford, CA.
- Graduate Studies in Air Pollution Monitoring and Control University of California, Berkeley, CA.
- B.S. in Mechanical Engineering Rensselaer Polytechnic Institute, Troy, N.Y.

Professional Affiliations

ACGIH, AIHA, ASHRAE, CSI, ASTM, ISIAQ, PARMA, and USGBC

Work Experience

Mr. Offermann PE, CIH, has 36 years experience as an IAQ researcher, technical author, and workshop instructor. He is president of Indoor Environmental Engineering, a San Francisco based IAQ R&D consulting firm. As president of Indoor Environmental Engineering, Mr. Offermann directs an interdisciplinary team of environmental scientists, chemists, and mechanical engineers in indoor air quality building investigations. Under Mr. Offermann's supervision, IEE has developed both pro-active and reactive IAQ measurement methods and diagnostic protocols. He has supervised over 2,000 IAQ investigations in commercial, residential, and institutional buildings and conducted numerous forensic investigations related to IAQ.

Litigation Experience

Mr. Offermann has been qualified numerous times in court as an expert in the field of indoor air quality and ventilation for both plaintiffs and defendants. He has been deposed over 150 times in cases involving indoor air quality/ventilation issues in commercial, residential, and institutional buildings involving construction defects, and/or operation and maintenance problems. Examples of indoor air quality cases he has worked on are alleged personal injury and/or property damages from mold and bacterial contamination/moisture intrusion, building renovation activities, insufficient outdoor air ventilation, off gassing of volatile organic compounds from building materials and coatings, malfunctioning gas heaters and carbon monoxide poisoning, and applications of pesticides. Mr. Offermann has testified with respect to the scientific admissibility of expert testimony regarding indoor air quality issues via Daubert and Kelly-Frye motions.



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